



Imperial Bureau of Plant Breeding and Genetics

Plant Breeding Abstracts

Vol. XVI, No. 4

(Abstracts Nos 1467—1956)

**School of Agriculture
Cambridge
England**

TABLE OF CONTENTS

		PAGE
061.3	Congresses	381
519	Statistics* (Empire)	381
	(Foreign)	403
57	Biological Sciences	403
575	Breeding* (Empire)	381
	(Foreign)	403
575.1	Genetics* (Empire)	384
	(Foreign)	421
575.2	Variations, Modifications, Mutations	424
575.4	Selection	425
576.1	Origin of Species	425
576.3	Cytology* (Empire)	385
	(Foreign)	426
577.8	Sexuality	430
578	Experimental Technique	430
58	Botany* (Empire)	386
	(Foreign)	430
631.531.12	Seed Production	386
632	Plant Diseases and Pests (Empire)	387
	(Foreign)	431
633	Economic Plants (Empire)	387
	(Foreign)	435
633.1	Cereals (Empire)	387
	(Foreign)	437
633.11	Wheat (Empire)	387
	(Foreign)	438
633.12	Buckwheat	442
633.13	Oats (Empire)	389
	(Foreign)	442
633.14	Rye	444
633.15	Maize (Empire)	389
	(Foreign)	444
633.16	Barley (Empire)	389
	(Foreign)	447
633.17	Millets and Sorghum (Empire)	390
	(Foreign)	449
633.18	Rice (Empire)	390
	(Foreign)	450
633.2	Forage Grasses (Empire)	391
	(Foreign)	451
633.3	Leguminous Forage Plants (Empire)	391
	(Foreign)	453
633.4	Roots and Tubers (Empire)	391
	(Foreign)	455
633.5	Fibres (Empire)	392
	(Foreign)	458
633.6	Sugar Plants (Empire)	397
	(Foreign)	460
633.7	Stimulants (Empire)	398
	(Foreign)	466
633.84	Condiments	468
633.85	Oil Plants (Empire)	398
	(Foreign)	468
633.86	Pigment Plants	398
633.88	Medicinal Plants (Empire)	398
	(Foreign)	469
633.91	Rubber Plants (Empire)	399
	(Foreign)	470
634	Fruits and Nuts (Empire)	400
	(Foreign)	471
634.9	Forestry (Empire)	401
	(Foreign)	478
635	Vegetables (Empire)	401
	(Foreign)	479
	Book Reviews	485
	New Journals	491

Note.—Initialled abstracts are written by the following:

Mr V. Akimoff	V. A.
Dr L. P. Bao	L. P. B.
Miss E. Eylenburg	E. E.
Dr H. Fox	H. F.
Dr J. G. Hawkes	J. G. H.
Mrs R. M. Ingham	R. M. I.
Miss E. Wilson	E. W.

* General studies, see also individual crops.

Plant Breeding Abstracts

Vol. XVI, No. 4

Part I. Empire Section

CONGRESSES 061.3

1467. STRATTON, F. J. M. 061.3
International scientific co-operation.

Advanc. Sci. 1946 : 3 : 349-50.

A survey is given of the activities of the International Council of Scientific Unions.

1468. **Scientific Research and Industrial Planning.** 061.3(42)
Advanc. Sci. 1946 : 3 : 286-333.

A full report is presented of the Conference on Scientific Research and Industrial Planning, organized by the British Association for the Advancement of Science, and held in London, December, 1945.

*STATISTICS 519

1469. SUKHATME, P. V. 519.271.3(54)
Bias in the use of small-size plots in sample surveys for yield.

Curr. Sci. 1946 : 15 : 119-20.

Investigations in various provinces of India on the value of the small-sized plot in making sample surveys of yield are reported.

*BREEDING 575

1470. **Thirty-sixth Annual Report of the John Innes Horticultural Institution for the year 1945** (1946) : Pp. 28. 575:633(42)

Genetics and cytology

Further investigations on the interaction between different *S* alleles in polyploids of *Oenothera organensis* are reported.

A study is being made of the rates of natural and X-ray induced mutation at the *S* locus in sweet cherries and *Oenothera*.

The effect of X-rays upon meiosis is receiving attention.

An experiment was carried out to determine the effects of a low dosage of radium irradiation on chromosome breakage and reunion in *Trillium grandiflorum*.

Spontaneous chromosome breakage is reported in *Lilium testaceum*, *Galanthus rizehensis* and *Tradescantia bracteata*.

The action of camphor, lactic acid, D.D.T., Gammexane and the sulphonamides upon plant cell nuclei has been investigated.

Polygenic inheritance was investigated in *Drosophila melanogaster*.

Non-viable pollen grains of *Tradescantia bracteata* have been observed, only two-thirds the volume of normal pollen. They possess the normal chromosome number of $n = 6$, but show abnormal development from telophase onwards. At this stage the cytoplasm divides between two nuclei which remain of equal size and staining density. When stained with Feulgen's reagent these nuclei show the characteristic nucleic acid deficiency of normal vegetative nuclei. The percentages of inversion bridges and fragments observed in meiotic anaphases appear to be too low to explain the origin of these abnormal pollen grains. The clone showing this dwarf pollen has been particularly valuable in X-ray experiments.

Seed production

Investigations on the isolation requirements of various crops are reported.

In connexion with the artificial drying of seeds, a cytological study is being carried out to determine the cause of the delay in germination which occurs when seeds are heated to about 5° C. below the death-point.

* General studies, see also individual crops.

Potato

Work on aberrant types has continued.

From a comparison of chromosome configurations in artificially induced tetraploid forms of *Petunia* and *Solanum polyadenium* with those found in the cultivated potato and in hybrids of *S. demissum* x *S. Rybinii* and (*S. demissum* x *S. Rybinii*) x *S. tuberosum*, it is concluded that the cultivated potato is an allotetraploid hybrid between related species whose chromosomes are structurally similar.

Rubus

Virus control investigations included trials of F_1 hybrids and stocks of Lloyd George and Norfolk Giant.

Data are given on meiosis in the youngberry; this was found to be irregular. The youngberry originated as a hybrid between the allohexaploid Phenomenal berry, which has a similar origin to the loganberry, and the hexaploid Mayes dewberry. Hybrids between the loganberry and youngberry are, therefore, in effect a back-cross to the loganberry; many of the hybrids are aneuploids, and even in the euploids meiosis is irregular. The youngberry and loganberry were both found to be completely self-compatible. The cross loganberry x youngberry is also compatible, but the reciprocal is completely incompatible. This incompatibility is due to the slow growth of the pollen tubes, which fail to reach the ovary. The inhibition is greater at higher temperatures. The progeny of youngberry selfed and from the youngberry and loganberry F_1 and F_2 hybrids exhibited a wide range of male and female sterility, which obscures the incompatibility relations. It was possible, however, to show that the progeny of youngberry selfed segregated into plants compatible and incompatible with loganberry pollen.

Apple

Triploid seedlings of Northern Spy, Beauty of Bath and other varieties have been secured by a method based upon the results of investigations on *Oenothera*. Heat shocks are given to pollen mother-cells, mixed haploid and diploid pollen being produced. This pollen is applied to incompatible styles, and only the diploid pollen functions. Varieties amenable to this treatment contain pairs of S alleles that interact in the pollen.

Cherry

Pollination tests have shown that Merton Heart is incompatible in Group VI and Merton Bigarreau in Group II. Both varieties show disease resistance, and give consistently good yields. Three new seedlings, Nos 185, 418 and 490, are considered to be of commercial value.

Tomato

Investigations on hybrid vigour were continued.

Varieties of the so-called bush and dwarf tomatoes have been studied; morphological observations indicate that several named varieties are very closely alike if not identical.

Breeding and selection for frost resistance is reported. Wild tomatoes from high altitudes in Peru have been crossed with commercial types.

Phaseolus

Two kinds of progeny have been observed in the F_1 of the cross between *P. vulgaris* and *P. multiflorus*; both have the climbing habit, but one is green and vigorous, while the other is small and weak with yellowish foliage. These differences are conditioned by a gene belonging to *P. multiflorus* in which species it is cryptic. Plants of *P. multiflorus* appear alike whether they are homozygous for this gene or its normal allelomorph or heterozygous. Some lines in the later generations of the hybrids are fairly uniform for the general habit of *P. vulgaris*, but possess inflorescences held out from the foliage as in *P. multiflorus*. These lines will be back-crossed to *P. vulgaris* to improve the quality of the pods.

A selection from natural hybrids between Comtesse de Chambord and a (?) dark-seeded French bean has been named Merton Early Haricot. Its chief advantages are its compact growth habit and early maturity; sown in mid-May the crop is ready for harvesting early in September. The seeds of the new variety are white and thin-skinned, similar to those of Comtesse de Chambord.

Sweet corn

Selection for cold resistance was continued. The best plant survival (35%) was shown in the F_3 of a cross between sweet corn and a Peruvian pop corn.

Mature sweet corn grain has been found to contain twice as much nicotinic acid as starchy corn. It is likely that this effect is an expression of difference in the *Su su* genes.

1471.

575:633(54)

Proceedings of the 33rd Indian Science Congress, Bangalore 1946 : Pt.

II : Sect. VI, Botany. Pp. 16.

The achievements and problems of breeding the various kinds of crops in India, the importance of plant collections, and the value of vernalization in agriculture and plant breeding are discussed.

1472.

575:633(71.3)

Sixty-ninth Annual Report of the Ontario Agricultural College and Experimental Farm, Department of Agriculture 1943 : (1944) : Pp. 86.**Wheat**

Winter wheat breeding is in progress.

Oats

Leaf and stem rust resistance and smut resistance have been combined in several varieties, which also show high yields and satisfactory straw strength.

Barley

New smooth-awned types showing resistance to both stem rust and mildew have been developed. Progress has been made in combining good malting quality and the smooth-awned condition. Work attempting to combine these two characters with high yield, strength of straw and early maturity is to be carried out.

Forage crops

The extensive programme of breeding improved strains of grasses and clovers has been continued. Special attention is being given to vitamin C analysis; significant differences between varieties and strains have been observed in the content of this vitamin.

Fruits and vegetables

An extensive analysis of vitamin C content in fruit and vegetable varieties is reported. Breeding work is under way to produce a canning tomato which will mature earlier than the varieties at present available.

1473.

575:633(72.92)

Annual Report of the Department of Agriculture, Jamaica, for the year ended 31st March, 1945 (1946) : Pp. 14.

In addition to varietal trials of many crops the following work is reported:—

Sugar cane

Data are given on varietal susceptibility to mosaic.

Coconut

Selection work is reported.

Banana

Breeding for resistance to the Panama and leaf spot diseases was continued.

Primary crosses previously in use have again been made. Occasionally viable seed has been obtained from Gros Michel when crossed with *M. Balbisiana*, but none when crossed with *M. nagenium*, *R. rubra* or Tagwin 3. *M. Cavendishii* var. Giant Govenor has again failed to set seed, but new seedlings have been selected for trial. Long Tavoy seedlings are being selected for breeding purposes.

Cytological investigations in connexion with breeding work were resumed. The value of colchicine in breeding work is also receiving attention.

Cold storage trials of seedlings and varieties are in progress.

1474.

575:633(94.3)

Annual Report of the Department of Agriculture and Stock, Queen's-land, for the year 1944-45 (1945) : Pp. 40.

In addition to varietal trials the following breeding work is reported:—

Wheat

New hybrids, shortly to be released for general cultivation, have been developed.

Sorghum

A new selection of Wheatland shows promise; in certain characteristics it is intermediate between Wheatland and Kalo. Various hybrids were selected.

Cotton

The objectives of breeding work are (1) to develop from present commercial stocks a Miller strain with a more open type of growth habit, higher lint percentage and greater drought resistance, and (2) to produce jassid resistant strains. Selection of Miller is reported; the improvement of the ginning percentage of Miller with the maintenance of its other desirable characteristics appears to be possible. Advanced strains of Miller and hybrids of Miller and U.4 were tested for characters other than jassid resistance, since jassid infestation was only light under the dry conditions of the season under review. The highly jassid resistant strain Miller III-26-0 was released for commercial distribution as Lot 1. Promising re-selections of this and other Miller jassid resistant strains have been secured. Two high-yielding hybrids have been released under the lot numbers Umil 11 and 12. Advanced hybrids and strains of Miller were tested for jassid resistance under conditions of late planting and heavy irrigation. The work of imparting jassid resistance to Triumph, New Mexico and Lone Star was continued by back-crossing hybrids involving these varieties.

Selection of Triumph is in progress.

Strains of Qualla suitable for growing on infertile shallow sandy soils or under droughty conditions have been developed.

Pawpaw

Breeding work was continued.

1475. BOYCE, S. W.

575-18

Estimation of genes in inheritance of quantitative characters.

Nature, Lond. 1946 : 157 : p. 657.

It is pointed out that the calculations used by "Student" for estimating the minimum number of genes controlling the inheritance of quantitative characters in Winter's selection experiment involve so many uncertain assumptions that his final estimate should not be quoted. "Student" himself was doubtful whether his conclusion was valid.

***GENETICS 575.1**

1476. IRWIN, M. R.

575.1:615.37

Antigens, antibodies and genes.

Biol. Rev. 1946 : 21 : 93-100.

Information on the specificity, chemical action and genetics of the antigens occurring in *Diplococcus pneumoniae* and the birds and mammals is reviewed.

1477. L'HÉRITIER, P. L. and

HUGON DE SCOEUX, F.

575.182

Transmission of the carbon dioxide susceptibility of *Drosophila* by grafting.

Nature, Lond. 1946 : 157 : p. 728.

By transplanting ovaries of carbon dioxide resistant *Drosophila* females into susceptible forms and mating with resistant males, susceptible progenies were obtained. Carbon dioxide susceptibility is a unit hereditary character, not linked with any chromosomal gene, and is presumably a cytoplasmic component.

1478. WEISS, J.

575.243:537.5

Biological action of radiations.

Nature, Lond. 1946 : 157 : p. 584.

The author develops mathematically his theory of the mode of action of radiation on biological systems. Special emphasis is laid upon the formation and recombination of free radicals and atoms during irradiation. The relation between mutation induction and wave length is considered.

* General studies, see also individual crops.

1479. BOYCE, S. W. 575.42:575-18
Maximum rate of selection for dominant quantitative genes.

Nature, Lond. 1946 : 157 : p. 699.

Formulae are proposed for calculating the maximum rate of progress of selection for dominant quantitative genes, both for random-bred and inbred progenies.

*CYTOLOGY 576.3

1480. DANIELLI, J. F. 576.31:581.192
Establishment of cytochemical techniques.

Nature, Lond. 1946 : 157 : 755-57.

Criticism is made of the optimistic deductions drawn by many investigators from the use of various cytological techniques. The methods considered are centrifugation, maceration, the silver nitrate test for ascorbic acid, the calcium phosphate test for phosphatase, the Feulgen test for desoxyribose nucleic acid, the use of absorption spectra and treatment with enzymes to detect their normal substrates. In all these cases it is shown that insufficient attention has been paid to the complexities of the processes involved or to the effect which the techniques themselves may have on the organization of the cell.

1481. BAKER, J. R. and 576.31:581.192
 SANDERS, F. K.
Establishment of cytochemical techniques.

Nature, Lond. 1946 : 158 : p. 129.

While appreciating Danielli's criticism of many of the conclusions drawn from present-day cytochemical techniques (cf. Abst. 1480), the authors consider that he has gone too far in his sceptical attitude to the tests discussed. It is believed that a considerable amount of valuable information on the location of substances within the cell can be gained by the judicious application of the techniques criticized.

1482. DANIELLI, J. F. 576.31:581.192
Establishment of cytochemical techniques.

Nature, Lond. 1946 : 158 : 129-30.

Replying to the rejoinder made by Baker and Sanders to his first communication (cf. Abst. 1481), the author points out that Baker and Sanders are not sufficiently rigorous in their reasoning. It is agreed that the principle of Occam's Razor decides at the moment in favour of the presence of desoxyribose nucleic acid in the chromosome, yet it is pointed out that this principle only indicates which of two working hypotheses appears more profitable to use, not which hypothesis is in fact true. Baker and Sanders are also thought to use inductive reasoning too loosely.

1483. STACEY, M., 576.312:581.192:578.65
 DERIAZ, R. E.
 TEECE, E. G. and
 WIGGINS, L. F.

Chemistry of the Feulgen and Dische nucleal reactions.

Nature, Lond. 1946 : 157 : 740-41.

Investigations are summarized showing that the Feulgen and Dische colour reactions used for demonstrating the presence of desoxyribose nucleic acid in biological material are probably effected by the direct interaction of the testing agents with ω -hydroxylaevalinic aldehyde. This substance is formed by mild hydrolysis of desoxyribose, but is also formed by hydrolysis of various related carbohydrates.

1484. SAMPATH, S., 576.35:581.04
 RAJAN, S. S. and
 SINGH, S. P.

Chemical structure in relation to action on plant nucleus.

Curr. Sci. 1946 : 15 : p. 137.

A study was made of the cytogenetic effects of treating seeds of *Cajanus indicus*, *Triticum vulgare* and *Cucurbita maxima* with fluorene, fluoranthene and retene pastes. Except for

* General studies, see also individual crops.

larger pollen grains, the plants from the treated wheat seeds closely resembled the control plants. The chief cytological effect in all three species was an increase in the number of nucleoli. No clear evidence of increases in chromosome number was obtained. Retene appeared to be the most effective chemical in its action upon the nucleus.

1485. DARLINGTON, C. D. and

LA COUR, L. F.

576.354.4:581.192

Nucleic acid and the beginning of meiosis.

Nature, Lond. 1946 : 157 : 875-76.

An examination of early meiotic prophase in *Fritillaria* spp. by means of an acetic-lacmoid squash technique has shown that the deoxyribose nucleic acid is distributed in a number of angular granules unconnected with the chromosomes. As meiosis proceeds, the granules shrink and finally disappear, the chromatin being transferred meanwhile to the meiotic chromosomes.

1486.

576.356:537.5

632.8:537.5

Radiation and living cells.

Nature, Lond. 1946 : 157 : 738-39.

The following papers read by speakers at a symposium on "Certain Aspects of the Action of Radiation on Living Cells" of the British Institute of Radiology during May 13-14 are of interest to geneticists and plant breeders:—

M. H. Salaman

For small viruses, the "target" size deduced from irradiation experiments remains constant for rays of varying ion-densities. In the case of larger viruses, especially vaccinia, the "target" size varies with the type of radiation used. It is suggested therefore that the smaller viruses are macromolecules or naked genes while the larger may be akin to unicellular organisms.

D. G. Catcheside

The number of chromatid, chromosome and isochromatid breaks is proportional to the dose and independent of the intensity for all radiations. These aberrations are attributed to the passage of a single ionizing particle through the chromosome. Exchanges between two breaks after X-irradiation increase more rapidly than the first power of the dose; their frequency diminishes with exposure time. Exchange breaks appear to be caused by two separate ionizing particles in the case of X-rays but by one particle only in the case of neutrons.

D. E. Lea

The numbers of the various types of aberrations produced by irradiation of *Tradescantia* microspores can be used to calculate such quantities as the distance apart of exchange breaks, the time during which breaks remain open, and the proportion of breaks which restitute. In order to have a probability approaching unity of breaking a *Tradescantia* chromatid, an ionizing particle should produce about twenty ionizations in the chromatid.

***BOTANY 58**

1487. TURRILL, W. B.

581.5:575.1:582

The ecotype concept. A consideration with appreciation and criticism, especially of recent trends.

New Phytol. 1946 : 45 : 34-43.

A review is presented of recent changes in the meanings attached to the terms *ecotype*, *ecospecies* and *coenospecies*. It is pointed out that a taxonomist cannot attach as much importance to cytogenetical considerations as some geneticists would prefer, for the taxonomist must consider the sum-total of plant characters and not the restricted sample accessible to genetical investigation. In particular, the author deprecates the exaggerated importance frequently attached to sterility barriers.

SEED PRODUCTION 631.531.12

1488. BATEMAN, A. J.

631.531.12:581.162.3

Genetical aspects of seed-growing.

Nature, Lond. 1946 : 157 : 752-55.

A general account is given of the principles involved in the determination of the isolation requirements of crops grown for seed. Three tolerance limits of contamination may be recognized,

* General studies, see also individual crops.

relating to commercial, stock and élite seed respectively. It is important to realize that the arrangement of the crops has a significant effect on their isolation requirements. In general, the relation shown by contamination between two varieties of a crop and the distance separating them can be represented as a logarithmic curve of negative slope. The various other factors determining the degree of contamination are considered.

*FUNGI AND FUNGOUS DISEASES 632.4

1489. INGOLD, C. T. 632.4:575.1

Genetics of the microfungi.

Nature, Lond. 1946 : 157 : 614-16.

A useful review is given of recent work on the genetics and reproductive behaviour of such fungous genera as *Glomerella*, *Ascobolus*, *Neurospora*, *Bombardia*, *Saccharomyces* and *Botrytis*. Most of the papers mentioned have already been reviewed in *Plant Breeding Abstracts*.

1490. SANSOME, E. R. 632.421.2:581.6:581.04:576.356.5

Induction of "gigas" forms of *Penicillium notatum* by treatment with camphor vapour.

Nature, Lond. 1946 : 157 : 843-44.

Gigas strains of *P. notatum* N.R.R.L. 1978 B have been obtained after treating the normal form with camphor. They differ from the original type in producing larger spores, but the penicillin content is not appreciably different. It is suggested that the gigas forms may be polyploid.

1491. SUBRAMANIAM, M. K. and 632.422.3:576.312.34:578.65

RANGANATHAN, B. Staining the chromosomes of yeast by the Feulgen technique.

Nature, Lond. 1946 : 157 : p. 657.

Figures are published of yeast chromosomes as revealed by the Feulgen technique. The value of this technique for distinguishing between chromatin and volutin is emphasized.

1492. NAIDU, M. and 632.484:576.353:576.312.35
BAKSHI, V. M.

The chromosome number in *Torula utilis*.

Curr. Sci. 1946 : 15 : p. 164.

The nucleus of *T. utilis* was found to divide mitotically in budding, two cells being produced each with four chromosomes. During mitosis two other bodies were observed, distinct from the chromosomes; these are regarded as centrioles.

ECONOMIC PLANTS 633

1493. 633.00.14(41)

Guide to Boghall Experimental Farm.

Edinb. and E. Scot. Coll. Agric., Edinburgh 1946 : Pp. 30.

A guide is presented to the trial and demonstration plots of cereals, grasses, legumes and other crops grown at the Boghall Experimental Farm, the Edinburgh and East of Scotland College of Agriculture. Notes are included on the cereal varieties grown on the farm.

1494. 633.00.14(42)

Key to varieties of field and vegetable crops under trial, observation and propagation.

Nat. Inst. Agric. Bot., Cambridge 1946 : Pp. 31.

A record is given of the crop varieties entered in the trials and observation plots of the National Institute of Agricultural Botany at Cambridge and other centres.

CEREALS 633.1

1495. 633.1:581.143.26.03(54)

KAR, B. K. 633.523:581.143.26.03(54)

Vernalization of crops cultivated in India.

Nature, Lond. 1946 : 157 : 811-12.

Data are presented on the response to vernalization shown by Indian varieties of wheat, oat, rice and jute.

* General studies, see also individual crops.

WHEAT 633.11

1496. THOMAS, I. and
MILLINGTON, A. J. 633.11:575(94)
Recent developments in Australian wheat-breeding.
J. Dep. Agric. W. Aust. 1945 : 22 : 277-93.
Wheat breeding work is briefly reviewed with reference to flour strength and disease resistance. A useful catalogue gives particulars of the varieties registered since 1927.

1497. New wheat varieties for the Wimmera and Mallee. 633.11:575(94)
J. Dep. Agric. Vict. 1946 : 44 : 148-49.
Descriptions are given of the new wheat varieties, Pinnacle and Insignia, suitable for the Wimmera and Mallee areas, respectively. Pinnacle is a selection of Pindar. It is a high-yielding mid-season variety, highly resistant to flag smut; the flour quality is superior to that of Pindar. Insignia has been bred from a cross between Ghurka and Ranee. It matures earlier than either parent, and is flag smut resistant and less susceptible to rust than Ranee. Insignia has given high yields during a six-year period; in baking quality it is equal to Ranee and superior to Ghurka and Quadrat.

1498. Personalities in plant breeding. 633.11:575:007(94)
J. Dep. Agric. W. Aust. 1945 : 22 : 302-03.
The pioneer achievements of William Farrer and J. T. Pridham in wheat breeding are described.

1499. MORAN, T. and 633.11:581.6(42)
JONES, C. R. 633.11:577.16(42)
Nutrients in British-grown and imported wheat.
Nature, Lond. 1946 : 157 : 643-46.
This review on the quality of British and imported wheats includes information on the protein and vitamin B₁ contents of a number of varieties determined from replicated field tests.

1500. ANDERSON, J. A. and 633.11:581.6(71)
AITKEN, T. R. 633.16:581.6(71)
**Nineteenth Annual Report of the Board of Grain Commissioners,
Grain Research Laboratory, Winnipeg, Manitoba 1945** (1946) : Pp. 63.
Milling, baking and other quality tests of named varieties and new hybrids of hard red spring wheat and amber durum wheat are reported.
In investigations on the hard red spring wheats the curves for loaf volume on mixing time appear to be promising as a method of routine varietal testing (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 732).
In the tests of malting barley 13 new hybrids showed promising quality in comparison with the standard O.A.C. 21. The new variety Montcalm exhibits considerable promise; large scale tests of its quality are planned.

1501. NEWTON, M. and 633.11-2.452:576.16:631.521.6(71)
JOHNSON, T.
Physiologic races of *Puccinia graminis tritici* in Canada, 1919 to 1944.
Canad. J. Res. 1946 : 24 : Sect. C : 26-38.
A survey is presented of the geographical and periodical distribution of physiological races of *Puccinia graminis Tritici* attacking wheat.

1502. PLATT, A. W. and 633.11-2.7-1.521.6(71)
FARSTAD, C. W.
The reaction of wheat varieties to wheat stem sawfly attack.
Sci. Agric. 1946 : 26 : 231-47.
Tests of a large number of wheat varieties for reaction to the sawfly (*Cephus cinctus* Nort.) are described. The criterion of damage found to be most satisfactory was the average of two independent determinations of the percentage of stems cut. In general, highly significant varietal differences in susceptibility were obtained. Hollow-stemmed varieties of *T. vulgare* usually showed susceptibility, while the solid-stemmed *T. vulgare* and *T. durum* varieties were usually resistant; and within each main group varietal differences were established. The effects of various factors, such as weather conditions and plot technique, on reaction to sawfly were investigated.

OATS 633.13

1503. STUART, A. 633.13(93.1)
Oats.

N.Z. J. Agric. 1946 : 72 : 461-65.

Notes are included on recommended varieties.

1504. LARMOUR, W. T. 633.13:575(71.3)
"No. 601" new promising oat variety has many outstanding qualities.

Canad. Grain J. 1946 : 1 : No. 9 : p. 10.

A note is given on No. 601, a promising new oat variety shortly to be named, which has been developed at the Central Experimental Farm. The following eight varieties are involved in its parentage: Alaska, Gold Rain, Legacy, Victoria, Vanguard, Victory and Black Mesdag. No. 601 is resistant to stem and crown rust, and possesses a stronger straw than the commonly grown varieties.

MAIZE 633.15

1505. WALKER, C. 633.15(93.1)
Maize growing for grain.

N.Z. J. Agric. 1946 : 72 : 281-99.

Descriptions of maize varieties suitable for cultivation in New Zealand are included.

1506. HURT, E. F. 633.15:575(42)
Maize for table and poultry feeding, a dual purpose hybrid.

J. R. Hort. Soc. 1946 : 71 : 138-41.

The problems of growing sweet corn and field maize in Britain are discussed. An account is given of an open-pollinated hybrid maize variety, to be named Golden Bounty, which can be used both as table maize, and when fully ripe, for livestock purposes.

1507. SPRAGUE, G. F. 633.15:575.125
The experimental basis for hybrid maize.

Biol. Rev. 1946 : 21 : 101-20.

An excellent review is given of early methods of maize breeding, and of the principles involved in the various stages of hybrid maize production. The problem of heterosis is discussed with reference to investigations on the effects of recessives, growth rates, convergent improvement, general and specific combining ability, and the use of chromosomal inversions as a method of locating factors responsible for heterotic effects. Information on disease and insect resistance and chemical composition is also surveyed. A list of 124 references is included.

BARLEY 633.16

1508. 633.16:581.6:575(71.24)
Long search for dual purpose barley now appears on road to success.

Canad. Grain J. 1946 : 1 : No. 9 : p. 13.

Barley hybrid lines showing promise as varieties suitable for both stock feeding and malting have been developed as a result of ten years' work at the University of Saskatchewan. The malting variety, O.A.C.-21, is involved in their parentage. The four most promising lines have been designated, 1926-0-0, U.S.-8 (Sask. 2144), P-26-1 and 1035-1.

1509. LEJEUNE, A. J. 633.16-2.452-1.521.6:581.6:575.116.1(71)
Correlated inheritance of stem rust reaction, nitrogen content of grain and kernel weight in a barley cross.

Sci. Agric. 1946 : 26 : 198-211.

The inheritance of reaction to stem rust in the cross O.A.C.21 x Chevron was found to be determined by a single factor pair, resistance being dominant. The inheritance of nitrogen content and kernel weight both appeared to be conditioned by multiple factors, and characters showed transgression. The F₃ progeny tended to be lower in kernel weight and higher in nitrogen content than the parents. Low kernel weight was found to be associated with rust resistance; few or none of the factors governing nitrogen content appeared to be linked with the factor for reaction to stem rust. It is suggested that the growing of large populations is advisable in breeding work in which Chevron is used as a source of stem rust resistance, in order to break the association between low kernel weight and stem rust resistance.

1510. FARSTAD, C. W. and PLATT, A. W. 633.16-2.7-1.521.6(71)
The reaction of barley varieties to wheat stem sawfly attack.
Sci. Agric. 1946 : 26 : 216-24.

In varietal tests of barley significant differences in reaction to the wheat stem sawfly (*Cephus cinctus* Nort.) have been shown, which are in general agreement with previous field observations in early sown crops. The most resistant varieties were Trebi, Plush, Prospect and Newal, while Hannchen and Rex proved to be the most susceptible varieties. It is pointed out that, although the economic damage to the barley crop by this pest is relatively small, damaged barley is a source of infestation to wheat and should be avoided by sowing only resistant barley varieties.

MILLETS AND SORGHUM 633.17

1511. SANKARAM, A. 633.17:575(54)
A plea for more millets.
Indian Fmg 1946 : 7 : 72-76.

A list of improved strains of millets developed in Madras is included.

RICE 633.18

1512. CHAO, LIEN-FANG and HSU, KUAN-JEN 633.18:581.143.26.035.1(51)
633.18:575.11"793"(51)
A study of the time of heading in *Oryza sativa* L.
Indian J. Genet. Pl. Breed. 1944 : 4 : 69-74.

The effect of various short-day treatments upon the time of heading in *Oryza sativa* var. *indica* and var. *japonica* was investigated.

The mode of inheritance of the time of heading was studied in the crosses, September Translucent x Anwei Scented and Nanking Quality x Yunnan Scented. In the first cross, time of heading exhibited simple Mendelian segregation, lateness of heading being dominant to earliness. In the second cross the mode of inheritance of heading time appeared to be more complicated, however, and the interaction of four factors, designated L_1 , L_2 , S and A , is suggested as follows. Lateness in heading depends upon the presence of L_1 and L_2 ; S is a "shifter" factor, which in the presence of L_1 and L_2 , results in medium maturity, while A is an "anti-shifter", with little or no effect upon the action of L_1 and L_2 but inhibiting the expression of S .

1513. KUANG, H. H., TU, D. S. and CHANG, Y. H. 633.18:581.46:57:575.116.1(51)
Linkage studies of awn in cultivated rice (*Oryza sativa* L.).
J. Genet. 1946 : 47 : 249-59.

The inheritance of awnedness was investigated. The inheritance of dwarfness, pubescence of the hull, the character of the endosperm, and the colour of the leaf-sheath, hull, pericarp, auricle and juncture, internode, midribs, ligule, apicules and the empty glume were also investigated, together with the relationship of these characters with the awned character.

The mode of inheritance of the awn varied in different crosses. In the crosses, awned Chou-chiu-ku x awnless Tze-ta-hei and awnless Ta-hei x awnless Huang-hsueh-no, two complementary factors appear to be responsible for the production of awns. In the first combination the two dominant factors for the presence of awns enter into the cross from one parent, while in the second each parent possesses only one factor. The data from the crosses, awnless Huang-mu x awned Hei-chueh-chiu-li-hsiang-keng and awnless Hua-yan-no x awned Hei-chueh-chiu-li-hsiang-keng indicate that two duplicate factors determine the dominant character of awnedness. In the cross awned N.C.U. No. 312 x awnless Binastian, the awned and awnless plants segregate in a simple Mendelian ratio, with the awned character dominant.

The recessive factor for dwarfness was found to be linked with one of the two complementary factors for awns in the crosses Chou-chiu-ku x Tze-ta-hei and Ta-hei x Huang-hsueh-no, with a crossing-over value of $11.38 \pm 3.61\%$ and $22.99 \pm 5.20\%$, respectively. In the cross Huang-mu x Hei-chueh-chiu-li-hsiang-keng one of the two duplicate factors determining awnedness showed linkage with an epistatic factor for black hull colour, with a crossing-over value of $20.80 \pm 4.20\%$. All the other characters investigated were found to be inherited independently of the factors for awns.

1514. KUANG, H. H.,
CHANG, Y. H. and
TU, D. S. 633.18:581.48:575.114.3:582(51)
Studies on the variation of polyhusks in cultivated rice (*Oryza sativa L.*).
J. Genet. 1946 : 47 : 260-70.

An abstracted version of this paper has already been summarized (cf. Abst. 1762).

FORAGE GRASSES 633.2

1515. CLARKE, S. E.,
CAMPBELL, J. A. and
SHEVKENEK, W. 633.2:582(71)
The identification of certain native and naturalized grasses by their vegetative characters.
Tech. Bull. Dep. Agric. Dom. Canad. 1944 : No. 50 : (Publ. 762) Pp. 129.
A key is presented for the identification, by means of certain vegetative characters, of 102 native and naturalized grass species occurring in the Prairie Provinces.

1516. FITZPATRICK, J. M. 633.288:576.312.35
A cytological and ecological study of some British species of *Glyceria*.
New Phytol. 1946 : 45 : 137-44.
A cytological examination has been made of British representatives of the genus *Glyceria*. The following chromosome numbers are reported: *G. declinata* Bréb., $2n = 20$; *G. plicata* Fr., $2n = 40$, *G. fluitans* R. Br., $2n = 40$; *G. plicata* x *G. fluitans*, $2n = 40$; and *G. maxima* (Hartm.) Holmb., $2n = c.60$.

LEGUMINOUS FORAGE PLANTS 633.3

1517. WHITE, W. J. 633.31:581.165.72
An improved method of rooting alfalfa cuttings.
Sci. Agric. 1946 : 26 : 194-97.
A successful method of rooting stem cuttings of lucerne in running water is described. It is pointed out that the method should be useful in breeding work and for the production of F_1 hybrid lucerne.

ROOTS AND TUBERS 633.4

1518. **Strains of swedes.** 633.42.00.14(42)
Fmrs' Leafl. Nat. Inst. Agric. Bot., Cambridge 1946 : No. 10 : Pp. 4.
During the period 1939-43, trials of approximately 50 strains of swedes and turnips, mostly of the creamy yellow flesh type, were conducted at five trial centres by the National Institute of Agricultural Botany. The strains are grouped according to skin colour, and the results of the trials suggest that skin colour is a useful guide to frost resistance and some other characters in three of the four groups.

1519. **Potato-growing trials.** 633.491:575(41.5)
Leafl. Min. Agric. N. Ire. 1946 : No. 7 : Pp. 11.
The average results of potato variety trials conducted during the period 1937-45 are reported. Descriptive notes are given on promising varieties introduced in recent years and the newer varieties bred in Ulster. Ulster Ensign and Ulster Premier were released for commercial production in the years 1944 and 1945. Ulster Premier is a first early variety, similar in tuber colour to King Edward. Ulster Ensign, also similar in tuber colour to King Edward, is a very heavy cropper. It may be used as a second early or to replace King Edward.

1520. **What the scientists are doing. Potatoes.** 633.491:575(54)
Indian Fmg. 1946 : 7 : 84-86.
Potato breeding work in India is briefly reviewed.

1521. HAWKES, J. G. and
DRIVER, C. M. 633.491:581.143.26.035.1:576.16
Origin of the first European potatoes and their reaction to length of day.
Nature, Lond. 1946 : 157 : p. 591.

In reply to an article by van der Plank (cf. Abst. 1522) the authors agree the first potatoes introduced into Europe were probably short day forms. They show however that even as early as the first decades of the nineteenth century, the original short day reactions of cultivated varieties had become modified by selection in the direction of long day adaptation.

1522. PLANK, J. E. VAN DER. 633.491:581.143.26.035.1:576.16
Origin of the first European potatoes and their reaction to length of day.
Nature, Lond. 1946 : 158 : p. 168.

The author criticizes the theory suggested by Hawkes and Driver (cf. Abst. 1521) that the original potatoes introduced into Europe were at a disadvantage as regards yield owing to their short-day adaptation. It is suggested as an alternative that the first introductions may have yielded satisfactorily through being harvested in late autumn. The modern tendency of favouring early potatoes to avoid blight is thought to have obscured the true nature of the climatic adaptability of the potato.

1523. HAWKES, J. G. and
DRIVER, C. M. 633.491:581.143.26.035.1:576.16
Origin of the first European potatoes and their reaction to length of day.
Nature, Lond. 1946 : 158 : 168-69.

In reply to van der Plank's recent criticism (cf. Abst. 1522), the authors point out that the supposition that the early potatoes were under no disadvantage as regards yield, at least under the frostless conditions of south-western Ireland, is based on no concrete evidence.

1524. BAWDEN, F. C. and
KASSANIS, B. 633.491-2.8-1.521.6
Varietal differences in susceptibility to potato virus Y.
Ann. Appl. Biol. 1945 : 33 : 46-50.

Varietal differences were demonstrated in susceptibility to infection by the potato virus Y, in the concentration of virus reached in the sap, and in efficiency as sources of virus for the aphids. The American variety Katahdin showed the most resistance among the varieties tested, but commercial English varieties also showed significant differences in susceptibility. Relative susceptibility in the open, under conditions of equal chances of infection, was found to be correlated with susceptibility when colonized with infective aphids; greenhouse tests are described which are considered to be valuable in breeding for virus Y resistance. The field tests further demonstrated that susceptibility to virus Y infection and to the leaf-roll virus are independent.

FIBRES 633.5

1525. Progress reports from experiment stations. Season 1944-1945.
Programmes of experiments. Season 1945-1946. 633.51:575
Emp. Cott. Gr. Corp. Lond. 1946 : Pp. 142.

Queensland. Regional Experimental Station, Biloela.
Progress Report for 1944-45 season. (pp. 1-13).

Progress in improving Miller and developing jassid resistant strains of this and other varieties is reported. In the absence of a severe jassid attack in the season under review, tests of hair density were carried out. Data were obtained on the more advanced strains of Miller and hybrids between Miller and U.4, apart from jassid resistance. The Miller strain III-26-0, released as Lot I, gave a good performance under dry conditions. Newer jassid resistant strains of Miller are, however, under observation; these produce longer fibre and have a more open growth habit than Lot I, and may eventually replace this strain. Advantage was taken of the fact that late-planted cotton grown luxuriantly with frequent supplementary irrigation usually suffers sufficiently from jassid attack to indicate degrees of resistance; new strains of Miller and hybrids between Miller and U.4 exhibited a jassid resistance superior to that of the present commercial varieties.

*MacDonald, D.,
Fielding, W. L.,
Ruston, F. D. and
King, H. E.*

*South Africa. Cotton Experiment Station, Barberton.
Progress Report for the season 1944-45. (pp. 14-29).*

Work on the following hybrids is reported: U.4/5143 x Cambodia; U.4/8161 x M.U.8; M.U.8 x Tidewater; M.U.8 x Meade; U.4/5143 x Meade; M.U.8 x Gen. 33 and U.4/5143 x Gen. 33; U.4/5143 x B.P.52 and M.U.8 x B.P.53; back-crosses of U.4/5143 x P.B. 52 and M.U.8 x B.P.53 to P.B. 52; back-crosses of M.U.8 x Meade and U.4/5143 x Meade to P.B.52; crosses of U.4/8161 with Sea Island and Egyptian; U.4/5143 x Egyptian; M.U.8 x Sea Island; and crosses of Sea Island, Egyptian and Tangiis with B.P.52. Investigations on the relationship between hairiness and jassid resistance have shown that (1) hairiness approximating to the standard of M.U.8 confers almost complete protection from the pest, once the seedling stage is over; (2) differences in the rate of developing hairiness must be considered in breeding hairy types; and (3) a good degree of hairiness on either the leaf lamina or the mid-rib confers definite resistance.

*Cameron, G. S. and Southern Rhodesia. Season 1944-45. (pp. 30-31).
McKinstry, A. H. Cotton Research Station, Gatooma. Progress Report
for the season 1944-45. (pp. 31-39).*

The strains 9L34 and 9L18, derived from U.4/64/V and U.4/64/7/10 respectively, gave similar yields in the season under review. In lint quality 9L34 and related strains, however, show superiority over 9L18 and other U.4/64/7/10 families and the hybrid strains bred at Gatooma.

*Anson, R. R., Anglo-Egyptian Sudan. Progress Report of the
Knight, R. L. and Plant Breeding Stations, season 1944-1945. (pp.
Evelyn, S. H. 40-64).*

The following work on Egyptian cottons is reported at the Gezira Station:—

Domains Sakel is being selected for earliness and several other characters.

Selection work on BAR.N.T.2 is being continued with the object of obtaining a strain to replace X1730A. BAR.N.T.2/41 progenies possessing the B_2 factor for black-arm resistance from American Upland were selected.

Spinning test data indicate that the B_2 factor for black-arm resistance from *G. punctatum* can be transferred without adversely affecting quality, as is also the case with the B_1 and B_2 genes from American Upland.

Selection of BAR.X1730L, carrying the B_2 factor, is reported. Later X1730 back-crosses containing the B_2 and the B_3 factors were also studied. In general back-crosses containing B_3 gave higher seed cotton yields and higher lint indices than those containing B_2 .

Leaf curl resistant selections of Massey's Domains Sakel and commercial Domains Sakel have been secured.

Fuzzed seeds are reported in the strains X1730A and N.T.2. It is thought that these arose as mutations from the tufted condition in the manner previously reported in Sea Island cottons. The following breeding work has been conducted at the Shambat Station:—

The transference of the genes B_1 and B_2 for black-arm resistance to Domains Sakel and X1730 is in progress. The factor for black-arm resistance of *G. sanguineum* [*G. arboreum* L. race *bengalense* (Silow)] is being transferred to Egyptian types. In addition crosses were made between types possessing black-arm resistance transferred from *G. sanguineum* and Sakel varieties homozygous for B_1 , B_2 and B_3 , in order to study the relationship between the factor of the Asiatic cotton and the three known factors of the New World cottons.

In the work of breeding black-arm resistant strains of American Upland for use in the Southern Sudan, transference of the genes B_2 and B_3 to S.P.84R, Deltapine, 511D (from Uganda S.G.85), X.A.129 and B.P.52 is at various stages.

The resistance to pink bollworm (*Platyedra gossypiella*) of *G. armourianum* and the hexaploid *G. "armadense"* obtained from the cross *G. armourianum* x Sakel appears to be connected with an abundant supply of strong smelling essential oils in the plant. Crosses were made between *G. "armadense"* and Sakel with the object of transferring this character to Sakel.

G. anomalum has been found to be almost immune to black-arm, and *G. aridum* resistant.

In breeding for jassid resistance the transference of hairiness from a number of varieties and species to Sakel is being undertaken. The gene *H* from Tangiis has been added to black-arm resistant X1730 and is in the course of being added to Domains Sakel; a single major factor for hairiness from Carpulla (*G. barbadense*) is being transferred to the black-arm resistant X1730.

Other sources of hairiness include Marie-Galante (var. St Ignatius), the varieties of American cotton, Kapas Purao, Ferguson and M.U.8b, *G. tomentosum*, *G. anomalum* and *G. arboreum*. In American Upland cotton, Uganda S.P.84 is being used as the back-cross parent in the transference of the gene *H* from Tangüis; the *G. tomentosum* gene for hairiness is being added to X.A.129.

Work on the possibility of imparting the high ginning out-turn of Deltapine to X.A.129 without adverse effect upon the high quality of the lint of X.A.129 was continued. Selections showing the desired combination of quality and ginning out-turn were obtained in the second back-cross generation.

At the Kadugli Station, work was concentrated on the improvement of early maturing strains with low node number, high ginning out-turn and good quality. A selection from N.T.205/42 showed particular promise. Selection of Uganda B.181 and Uganda B.P.52 is also reported.

*Jameson, J. D. and
Weatherley, P. E. Uganda. Cotton Experiment Stations, Kawanda and
Serere. Progress Reports for the season 1944-45.
(pp. 65-77).*

In the Kawanda area breeding for resistance to black-arm and *Verticillium* wilt was continued. An attempt is being made to transfer the tufted seed type to B.P.52 to determine whether this type can be developed without impairing the ginning percentage. The gene conditioning the red type of plant occurring in Uganda has been identified as R_1 ; the red type appears to be associated with certain plant habits.

Black-arm resistance tests were carried out in the Serere area. Progenies from resistant phenotypes selected in the F_2 generation of the hybrid between B.P.52 and the resistant N.17 showed marked resistance, and no further selection was required. An experiment to determine the incidence of cross-pollination between plots of cotton separated by various distances is described. The intermediate leaf form of the hybrids between the okra-leaf and normal types was used in the estimation of out-pollination.

Peat, J. E. and
Prentice, A. N.
*Tanganyika Territory. Agricultural conditions and
their relation to cotton-growing in the Lake Province.
Ukiriguru and Lubaga Experiment Stations. Pro-
gress Report for the season 1944-45.* (pp. 78-107).

Breeding work in the Lake Province has as its aim the combination of lint fineness and jassid resistance. Several promising strains are under test. Strain trials held at the Lubaga and Ukiriguru Stations are reported. The testing of varieties and strains, particularly with regard to their reaction to insect pests, was continued in the Eastern Province. Selection of local derivatives and Sea Island x U.4 crosses was also continued.

Ducker, H. C., Nyasaland. Cotton Experiment Stations. Domira
Miller, W. L. and Bay Station, Progress Report 1944-45. Entomological
Pearson, E. O. work, Progress Report 1944-45. (pp. 108-22).

Strain Mz.561 continues to be satisfactory; T.22, the longest linted derivative of Mz.561, is probably an improvement over the parent bulk. In addition C.L.20 is as promising as these two selections.

West, J. Nigeria. Progress Report on cotton growing in the Northern Provinces for the season 1944-45. (pp. 123-31).

Varietal trials conducted in the Northern Provinces are reported. Open and self pollinated strains of Ishan A have shown no significant differences in lint measurements in the Southern Provinces. Selection was carried out to maintain the purity of Ishan A.

*Harper, A. S. and
Nanton, W. R. E.* *West Indies. Cotton Breeding Station—Montserrat.
Progress Report for the year 1945 and programme of
experiments for the year 1946. (pp. 132–36).
Progress report on the cotton breeding work at Camden
Park Experiment Station, St. Vincent, for the season
1944–45. (pp. 137–42).*

At the Montserrat Station selection is to be continued in M.4204 and M.4208.

Data are given on the VH progenies under observation at the Camden Park Experiment Station, St. Vincent.

1526. **Report of the Administrative Council of the Corporation submitted to the twenty-fifth Annual General Meeting on June 25, 1946.** 633.51:575
Rep. Emp. Cott. Gr. Corp. Lond. 1944-1945 (1946) : Pp. 20.

Mention is made of the main investigations of cotton breeding work in the various countries. The full report of these investigations is given in the progress reports of the various experiment stations (cf. Abst. 1525).

1527. SIMLOTE, K. M. 633.51:575(54)
Improvement of cotton in Central India.
Indian Fmg 1946 : 7 : 68-71.
An account is given of selection of desi cotton, which is a mixture of *G. arboreum* var. *neglectum* H. et G. and the introduced American *G. hirsutum*, breeding for wilt resistance, and selection and breeding of American cotton.

1528. CHANDRATANE, M. F. 633.51:565(54.8)
Cotton in Ceylon.
Trop. Agriculturist 1945 : 101 : 164-69.
Early investigations on the possibilities of cultivating cotton in Ceylon are reviewed, and an account is given of the acclimatization of imported cottons which has been carried out at the Tissamaharama Cotton Breeding Station with a view to the future breeding programme. The strain BP. 79 has given the most satisfactory results in both yield and staple length.

1529. HUTCHINSON, J. B. 633.51:575.115:576.356.5:575.41
On the occurrence and significance of deleterious genes in cotton.
J. Genet. 1946 : 47 : 272-89.
A survey is given of previously reported investigations on deleterious characters in the New World and Old World cottons, and hitherto unpublished data are given on several such characters. In the Old World species six deleterious characters have been recorded. Sterility, chlorophyll deficiency, curly leaf, virescent bud and simple leaf are recessive characters depending upon a single factor; the crumpled character is the result of the complementary action of two alleles at a single locus. In the New World cottons the virescent yellow, round leaf, crinkled-rugose-contorta, corky, semi-sterile, and glabrous dwarf characters are inherited on a single factor basis. The characters of chlorophyll deficiency, yellow mosiac, Moco crinkled, "lazy", and frilly show a duplicate factor genetical basis, while the Colombian dwarf, simple leaf and corky dwarf characters are inherited on a triplicate basis. A close similarity is to be observed between the deleterious characters of the Old and New World species.
The evolutionary significance of these deleterious mutants is considered. The occurrence of characters depending upon three genes suggests that the allopolyploid nature of the New World cottons is not in itself sufficient to explain the observed multiple factors inheritance. No genetic disintegration seems to be occurring in the allopolyploids under the shelter of duplicate normals. It appears that under natural selection the monomeric condition is established, and the functionally diploid condition is regained, as shown by the distribution of the *Chl* genes for chlorophyll deficiency. No evidence of a divergence of function between duplicate loci was found.
With the exception of the crumpled character all the deleterious mutants in the Old World cottons are completely recessive. The deleterious characters of the New World species, on the other hand, are incompletely recessive; in five characters, easily distinguishable heterozygotes have been recorded, and four other characters show incomplete dominance. The author suggests that this low level of dominance may be a consequence of the rapid evolution of the New World species.

1530. SIKKA, S. M., KHAN, IHSAN-UR-RAHMAN, and AFZAL, M. 633.51:576.312:576.356.5:576.16
Study of somatic chromosomes of some wild and cultivated species of *Gossypium*.
Indian J. Genet. Pl. Breed. 1944 : 4 : 55-68.
The somatic chromosomes of the following types of cotton were studied with particular reference to the number of satellites and nucleoli: 24 types of *G. arboreum* and *G. herbaceum*, the 289 F₁/43

and L.S.S. varieties of *G. hirsutum*, and the wild diploid species, *G. anomalam*, *G. Davidsonii*, *G. Harknessii*, *G. armourianum* and *G. Thurberi*.

The data suggest that the study of satellites and nucleoli, as in the case of the majority of the cultivated cottons with $2n = 26$, may provide fairly reliable clues to the phylogeny of the nucleus, but that in other types the supposed relationship of two nuclei in a diploid, three in a triploid and four in tetraploid, may break down, as in the *G. hirsutum* types.

Secondary constrictions in the nucleolar chromosomes of the primitive *africanum* variety of *G. herbaceum* and their transition into the satellite condition in the highly specialized *frutescens* and *typicum* varieties were observed, indicating that the satellite chromosome is the higher evolutionary form.

In the *G. herbaceum* varieties, shortening of the chromosomes and a tendency to possess sub-terminal primary constrictions of certain chromosomes has been observed to accompany evolutionary advance.

The observations on the morphology of the chromosomes of *G. hirsutum* fully confirm the hypothesis of the allopolyploid nature of the species.

In the *arboreum* cottons the structure of the nucleolar chromosomes within each group is constant and shows greater association with geographical distribution than with perennial or annual habit. The classification of the *G. arboreum* types is discussed in relation to the observations made on chromosome morphology and the classification of Hutchinson and Ghose based upon plant habit (cf. *Plant Breeding Abstracts*, Vol. VIII, Abst. 341).

1531. GOVANDE, G. K. 633.51:581.46:575.242:575.11(54)

A new mutant in Asiatic cottons.

Curr. Sci. 1946 : 15 : p. 170.

A mutant form of 1027 A.L.F. (*G. herbaceum*) is described; it has a monopodial habit, and a flower with an indefinite number of whorls of petals and bracts, which fails to set any boll. It is a simple recessive character, and the gene pair determining normal and multi-bracteolate flowers has been designated $M^b m^b$. Linkage studies show that the mutant gene is independently inherited of the factors for leaf nectaries, petal colour, pollen colour and anthocyanin pigmentation.

1532. HUTCHINSON, J. B. 633.51:581.49:575.11.061.6

The inheritance of brown lint in New World cottons.

J. Genet. 1946 : 47 : 295-309.

An investigation of the inheritance of brown lint colour in the New World cottons is reported. The major gene for brown colouration in *G. hirsutum* var. *punctatum* is shown to be distinct from the gene L_K^x for Guatemalan khaki. Harland's unpublished data are quoted to show that the major gene for brown colour in *G. barbadense* var. *Darwinii* is also independent of L_K^x . It is further suggested that the mahogany lint of the Pardo varieties of *G. barbadense* and the Cauca mahogany of *G. hirsutum* are determined by the same gene.

In the *G. hirsutum* Upland cottons, a gene is present which intensifies brown but produces no effect on white. In *G. hirsutum* var. *punctatum* and *marie-galante*, minor colour genes change white to "off-white" or even pale brown, as well as intensifying brown.

The gene for mahogany is highly dominant; it was also found to have considerable effect upon hair length, fineness and maturity.

The genetics of lint colour in the New World cottons is explained as the consequence of comparatively recent allopolyploid origin from a cross between an Old World cotton and an American wild species with light brown seed hairs, followed by human selection for contrasting lint colours.

1533. 633.51-2.7-1.521.6:575(54)

What the scientists are doing. Jassids in cotton.

Indian Fmg 1946 : 7 : 83-84.

A brief discussion of breeding for jassid resistance in cotton is included.

1534. PATEL, J. S.,
GHOSE, R. L. M. and
SANYAL, A. T.

633.523:575.11.061

The genetics of *Cochchorus* (jute). III. The inheritance of corolla colour, branching habit, stipule character, and seed coat colour.

Indian J. Genet. Pl. Breed. 1945 : 4 : 75-79.

In *Cochchorus capsularis*, yellow corolla colour has been found to be dominant to pale colour,

branched plant habit dominant to non-branched, and the normal stipule dominant to the foliaceous. The characters show monogenic inheritance, and the factor pairs have been designated, *Py py*, *Br br*, and *Sfl sfl*, respectively. In *C. olitorius*, dull black seed coat colour exhibits monogenic inheritance and is dominant to leek green colour; the factor conditioning seed coat colour in this species has been designated *Gr gr*. Certain tests of possible linkage with the anthocyanin factors (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 557) were made. No evidence of linkage in *C. capsularis* between *Py* and *C*, *A* and *R*, and between *Br* and *C* and *R*, was however obtained, nor between *Gr* and the anthocyanin factor of *C. olitorius*.

1535. GHOSE, R. L. M. and DAS GUPTA, B. 633.523:578.08:575.12(54)
Floral biology, anthesis, and natural crossing in jute.
Indian J. Genet. Plant. Breed. 1945 : 4 : 80-84.

An account is given of the floral biology, anthesis and natural crossing in *Cochchorus capsularis*, *C. olitorius* and some wild species. Natural crossing in *C. olitorius* was found to occur to a considerable extent, the need of protecting this species in breeding work thus being indicated. Natural crossing in *C. capsularis* was less frequent, but higher than 2%, which is the estimate made by previous investigators.

1536. 633.523:581.6:575.116.1:581.44(54)
Progress of technical schemes. Agricultural research.

Bull. Indian Cent. Jute Cttee 1946 : 12 : 640-41.

It is reported that at Dacca, bitterness in *Cochchorus capsularis* has been found to be conditioned by a single gene, which is linked with the factor *Br* for branching, with a cross-over of 30.5%. No evidence of linkage between the gene for bitterness and the *A* allelomorphic series for pigmentation has been obtained. Further linkage relationships are to be investigated.

1537. GUHA, M. P. 633.524.33:582(54)
White-flowered plant of *Urena lobata* Linn.—A new observation.

Curr. Sci. 1946 : 15 : p. 113.

A white-flowered form of *Urena lobata* L. has been found among a wild population in eastern Bengal.

SUGAR PLANTS 633.6

1538. STEVENSON, G. C. 633.61:575(69.82)
Sugarcane varieties produced by the Sugarcane Research Station, and their value to the sugar industry of Mauritius.

Bull. Mauritius Sugar Res. Sta. 1946 : No. 18 : Pp. 24.

An analysis is given of the effect of the varieties bred and released by the Sugarcane Research Station during the past 15 years upon commercial sugar production in the Colony of Mauritius. The following varieties are described: M.108/30, M.171/30, M.72/31, M.73/31, M.134/32 and M.112/34.

1539. YUSUF, N. D. 633.61:581.145.1.02(54)
Inducing flowering in non-flowering sugarcanes.

Curr. Sci. 1946 : 15 : 164-66.

A previous note reported investigations at Coimbatore on the induction of flowering in sugar cane varieties by suitable photoperiodic treatment (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 566). The present communication discusses the effect of manuring and irrigation upon flowering. The conclusion is reached that by adjusting the conditions of manuring and irrigation it is possible to induce flowering and control the times of flowering in different cane varieties for the purposes of breeding work.

1540. BRETT, P. G. C. 633.61:581.162.3(68.4)
Seed setting of sugar cane in South Africa.

Nature, Lond. 1946 : 157 : 657-58.

Viable pollen has been discovered in several sugar cane varieties grown at the Experiment Station, Mount Edgecombe, Natal. Successful pollinations were effected and seedlings have been raised.

STIMULANTS 633.7

1541. ENGLEDOW, F. 633.72:575
Tea.
Chem. Ind., Lond. 1946 : No. 123 : 220-21.
The agricultural and industrial problems of tea production are discussed. Reference is made to breeding for quality.

1542. Annual Report of the Indian Tea Association, Tocklai Experiment Station, 1945 : Pp. 18. 633.72:575(54)
An appendix gives the report on the tea breeding programme at the Tocklai Experimental Station, submitted in November, 1945.
The various problems involved in the breeding are discussed, and a detailed account is given of methods of line breeding and mass selection at the Tocklai Station. The problems of cuttings and bud-grafting are also discussed.
Attention is drawn to the need of a classification of recognized tea varieties and a study of the relationships of the types.

1543. Eighteenth Annual Report of the Board of the Tea Research Institute of Ceylon for 1943 : Bull. No. 25 : Pp. 63. 633.72:575.42(54.8)
A number of selections are undergoing preliminary trial as clones planted in the field.

1544. McMASTER, P. G. W. 633.73:575.42(67.8)
An impression of Lyamungu Coffee Research Station.
Mon. Bull. Coffee Bd Kenya 1946 : 11 : 57-58.
A brief account is included of selection work at Lyamungu, Tanganyika.

1545. CHEESMAN, E. E. 633.74.00.14(72.9)
Results of cacao experiments in 1944-45.
Trop. Agriculture, Trin. 1946 : 23 : 63-65.

A summary is presented of the results obtained in the field experiments of the Cacao Research Scheme during the crop year 1944-45. The differences in the performance of buildings and cuttings receive preliminary analysis. Notes are also included on the most outstanding clones of the older plantings.

OIL PLANTS 633.85

1546. SABNIS, T. S. and 633.853.49:582(54)
MEHTA, T. R.
A missing type of *Brassica campestris* recovered.
Curr. Sci. 1946 : 15 : p. 171.

Type 33 of *Brassica campestris* L., belonging to the *Pronisiliquosa* group of the cultivated mustards, was not to be found growing at the time of classifying the cultivated Indian mustards (cf. *Plant Breeding Abstracts*, Vol. VI, Abst. 1113). The type is distinguished by two-valved, pendant pods. The missing type has been recovered from a new collection of sarson in the United Provinces. This specimen has been designated type 4114.

PIGMENT PLANTS 633.86

1547. GANGULY, J. K. 633.862.9:576.312.35:581.162.51(54)
The somatic and meiotic chromosomes of *Commelina benghalensis* Linn.
Curr. Sci. 1946 : 15 : p. 112.

The chromosome number of *C. benghalensis* L. is reported to be $2n = 22$. No evidence of pollen sterility was obtained.

MEDICINAL PLANTS 633.88

1548. JAYAWEERA, D. M. A. 633.88(54.8)
Drug plants (indigenous and exotic) that can be grown in Ceylon—
Part 1.
Trop. Agriculturist 1945 : 101 : 130-35.

Some medicinal plants of Ceylon are described. The article is the first of a series giving alphabetically arranged notes on such plants.

1549. BARNARD, C. and FINNEMORE, H. 633.88(94)
Drug plant investigations. I. Progress report.

J. Coun. Sci. Industr. Res. Aust. 1945 : 18 : 277-85.

Investigations on the production of various drugs from the following plants are reported: *Atropa Belladonna*, *Hyoscyamus niger*, *Datura* spp., *Duboisia* spp., *Papaver somniferum*, *Ephedra* spp., *Artemisia maritima* and *Digitalis* spp.

1550. THOMAS, A. S. 633.885.1:575.42(67.61)

Cinchona in Uganda.

Emp. J. Exp. Agric. 1946 : 14 : 75-84.

An account of selecting cinchona (*Cinchona Josephiana* Wedd.) in Uganda is included.

RUBBER PLANTS 633.91

1551. MOORE, R. J. 633.913:576.312.35:575.127.2
Investigations on rubber-bearing plants. IV. Cytogenetic studies in *Asclepias* (Tourn.) L.

Canad. J. Res. 1946 : 24 : Sect. C. : 66-73.

The chromosome number of *A. syriaca* *A. incarnata* and var. *pulchra* and f. *albiflora*, *A. Sullivantii*, *A. tuberosa*, *A. curassavica* and *A. speciosa* was found to be $2n = 22$. Various inter-specific and intraspecific crosses were attempted. Mature pods were only obtained from the cross *A. incarnata* x *A. incarnata* f. *albiflora*; it is considered that technical difficulties in the hybridization of *A. incarnata* were largely responsible for the failure to obtain seed from intra-specific crosses of *A. incarnata*.

Possible natural hybrids between *A. syriaca* and *A. speciosa*, between *A. incarnata* and var. *pulchra* and between *A. incarnata* and f. *albiflora* are described.

Two chimaeras with tissue of *A. incarnata* and the *albiflora* form were observed. In these, pigmented stems bearing coloured flowers, and unpigmented stems with white flowers were produced from a single root. The colour difference appeared to be due to genic mutation, since the chromosome number was $2n = 22$ in both pigmented and unpigmented stems.

Self-pollination of *A. syriaca* and *A. incarnata* was attempted without success.

1552. BANNAN, M. W. 633.913:576.356.5:581.04:581.4(71)
Tetraploid *Taraxacum kok-saghyz*. II. Characters of F_1 plants grown in pots.

Canad. J. Res. 1946 : 24 : 81-97.

The morphological characters of the leaves and inflorescences in the parental colchicine-induced generation of *Taraxacum Kok-saghyz* plants have been described in a previous paper (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 86); the present paper reports comparative observations on the morphology of random diploids, F_1 diploids derived from colchicine-treated plants, and the F_1 generation of colchicine-induced tetraploids. In general, the organs of the F_1 tetraploids were more robust than those of the diploids, but increase in size was offset by reduction in number. Polyploidy had no effect upon self-incompatibility. No significant differences in mean fresh root weight between tetraploids and diploids were obtained, the increase in the thickness of the tetraploid roots being counter-balanced by a reduction in the number of the main divisions. In their growth the tetraploids were in general slower than the diploids; in this connexion it is emphasized that experiments dealt with potted plants only. Among the characters studied in various F_1 generations of tetraploids obtained by controlled crossing, leaf shape and head production were those whose mode of inheritance was most clear.

The relationship between root size and other characters was investigated.

1553. MOORE, R. J. 633.913:581.162.5:581.3
Investigations on rubber-bearing plants. III. Development of normal and aborting seeds in *Asclepias syriaca* L.

Canad. J. Res. 1946 : 24 : Sect. C. : 55-65.

The cause of the low percentage of flowers of *Asclepias syriaca* L. producing mature seed pods have been investigated. Two types of ovule abnormality are described: (I) ovules which show an excessive growth of the integument when the endosperm is at the free nuclear stage, and

(2) ovules which show a zone of collapsed cells surrounding the embryo-sac when the endosperm is in the multicellular condition. It is suggested that seed collapse of the former type is similar to cases attributed to a competition for food between the endosperm and adjacent material tissue of the ovule, and termed "somatoplasic sterility" by Brink and Cooper (cf. *Plant Breeding Abstracts*, Vol. X, Abst. 468).

1554. GORHAM, P. R. 633.913:581.192(71)

Investigations on rubber-bearing plants. II. Carbohydrates in the roots of *Taraxacum kok-saghyz* Rod.

Canad. J. Res. 1946 : 24 : Sect. C : 47-53.

The analytical data suggest the possibility of breeding strains of *T. Kok-saghyz* with high carbohydrate content, suitable for industrial alcohol production.

FRUIT AND NUTS 634

1555. 634.23(42.23)

Cherry day at East Malling.

Gdnrs' Chron. 1946 : 120 : 19-20.

An account is given of work on the cherry at East Malling, including the varietal collection and root stock investigations.

1556. INGRAM, C. 634.23:582

A revised classification of the deciduous cherries.

Gdnrs' Chron. 1946 : 119 : 196-97.

A revised classification of the sub-genera *Cerasus*, *Lithocerasus* and *Padus* is presented, based upon Koehne's system.

1557. 634.61:575(54.8)

Annual Report of the Coconut Research Scheme for 1943.

Ceylon, May 1945 : Sess. Pap. No. 4 : Pp. 22.

Selection was carried out at the Bandirippuwa and Ratmalagara Estates. The experiment on the plantation near Chilaw was continued; its object is to investigate (1) the inheritance of the character of high yield and associated characters, and (2) the relative merits of seed nuts derived from the first and second ripe bunches. The experiment on the acclimatization of palms to restricted environments and the development of ecotypes was also continued. The results so far obtained are not in favour of the "acclimatized" type.

1558. 634.61-1.531.12:575.42(54.8)

Yield recording and the issue of planting material by the Coconut Research Scheme.

Leafl. Coconut Res. Scheme, Ceylon 1941 : No. 11 : Pp. 8.

It has been found that for the purposes of seed production, classification of coconut palms into the different yield groups is possible on the basis of visual judgment alone after a three-year period of yield recording.

1559. BLAIR, D. S. and 634.7(71)

DAVIS, M. B.

Bush fruits.

Fmrs' Bull. Dep. Agric. Dom. Canad. 1945 : No. 131 : (Publ. 775) Pp. 22.

Notes are given on varieties of red, purple and black raspberry, black, red and white currant, gooseberry and blackberry.

1560. LESLIE, W. R. 634.7(71)

Growing small fruits in the prairie provinces.

Bull. Line Elevators Fm Serv., Winnipeg 1945 : No. 6 : Pp. 52.

Descriptions are given of small fruit species and varieties including the strawberry, raspberry, bush fruits, blueberry, cranberry, sweetberry honeysuckle, American elder and other fruits.

1561. DODDS, K. S. 634.771:576.312.35:582
Musa Fehi, the indigenous banana of Fiji.

Nature, Lond. 1946 : 157 : 729-30.

A description is given of the sterile indigenous Fijian edible banana known as Soaqa. It is classified as *M. Fehi* Bertero ex Vieill and has twenty diploid chromosomes. A fertile diploid variety resembling *M. Fehi* in vegetative characters but differing in its inflorescence has been discovered in Malaita.

1562. DODDS, K. S. and 634.771:576.356.5
 SIMMONDS, N. W.
Genetical and cytological studies of Musa. VIII. The formation of polyploid spores.

J. Genet. 1946 : 47 : 223-41.

By crossing *Musa* diploids ($2n = 22$), three F_1 families were obtained. An account is given of the breeding and cytological behaviour of the hybrids.

All the hybrids showed complete male sterility. When used as the female back-cross parent, one family was sterile, another produced only pentaploids ($2n = 55$), while the third gave two diploids and abundant triploids and pentaploids.

The type of restitution observed did not appear to be the result of irregularities in meiotic pairing, spindle formation or wall formation. Nor was it found to be associated with parthenocarpy. Its causes remain obscure.

1563. VENKATARAMANI, K. S. 634.771:582(54)
Studies on Indian bananas. I. A descriptive study of twenty-four varieties.

Proc. Indian Acad. Sci. 1946 : 23 : Sect. B : 113-28.

Descriptions are presented of 24 edible banana varieties grown in Southern India. The taxonomical problems of the edible bananas are discussed.

1564. VENKATARAMANI, K. S. 634.771-1.524(54)
"Kaio" an imported banana variety.
 Curr. Sci. 1946 : 15 : p. 110.

A description is given of the banana variety Kaio, recently introduced into southern India. The variety is being grown experimentally at Coimbatore.

FORESTRY 634.9

1565. PARSONS, T. H. 634.97(54.8)
Balsa as a commercial crop.

Trop. Agriculturist 1945 : 101 : 120-26.

Trial plantings of balsa (*Ochroma lagopus*) at Peradeniya have indicated that the tree has commercial possibilities for Ceylon when grown under certain conditions.

1566. JOHNSON, L. P. V. 634.97:575
Forest tree breeding.
 New Trail 1945 : 3 : 143-150.

Methods of forest tree breeding are discussed.

1567. JOHNSON, L. P. V. 634.972.3:575.12:578.08
Development of sexual and vegetative organs on detached forest tree branches cultured in the greenhouse.
 For. Chron. 1945 : 21 : 130-36. (N.R.C. No. 1281).

Experiments on the technique of the "detached branch" method used in the artificial hybridization of forest trees are reported. The material consisted of *Populus*.

VEGETABLES 635

1568. CORBETT, W. 635.64.00.14(42.23)
Experiments on the production of tomatoes in the open.

J. Pomol. Hort. Sci. 1946 : 22 : 1-10.

A report is given of trials carried out to test the suitability of several tomato varieties for crop production in the open.

1569. REID, W. D. and HASTINGS, A. 635.652(93.1)
Bean varieties. Descriptions of bean varieties used in trials of resistance to bean diseases.

N.Z. J. Sci. Tech. 1945 (1946) : 27 : Sect. A : 320-30.

Tables and photographs are given to describe the 72 varieties of dwarf and runner beans included in tests of resistance to halo blight, anthracnose and bean weevil (cf. Abst. 1570). A list of synonyms is appended.

1570. REID, W. D. 635.652-2-1.521.6(93.1)
Resistance of beans to halo-blight and anthracnose and the occurrence of bean-mosaic and bean-weevil.

N.Z. J. Sci. Tech. 1945 (1946) : 27 : Sect. A : 331-35.

Field tests of 72 varieties of dwarf and runner beans for resistance to halo blight, anthracnose and bean weevil are reported. All white-seeded and runner varieties were highly resistant to both diseases. No variety, however, showed immunity to both halo blight and anthracnose. The pods and foliage usually showed a similar degree of susceptibility, but a few varieties with highly infected foliage exhibited little or no pod infection.

Marked differences in susceptibility to the bean weevil were observed.

Only eight lines were tested for reaction to bean mosaic. Certain lines which in previous years had shown infection proved free from the disease on this occasion.

Part II. Foreign.

*STATISTICS 519

1571. FAN, F. R. and
Koo, W. F. 519.24:631.421:633.1
(Application of analysis of covariance to quasi-factorial experiment).
Kwangsi Agric. 1941 : 2 : 14-20.

Consideration is given to the problem of making adjustments for irregularities in cereal stands when performing an analysis of covariance in quasi-factorial field tests.

BIOLOGICAL SCIENCES 57

1572. [Scientific records of the Moscow State University, Jubilee Series (1755-1940), Vol. LIV, Biology]. 57:061.6(47)
Moscow 1940 : Pp. 371.

This jubilee volume, commemorating 185 years since the foundation of the University of Moscow, is a historical symposium containing 18 papers on the development of zoology, six on anthropology, and nine on botany. In two special chapters a brief account is given of students' scientific circles from 1917 to 1939, and of scientific societies attached to the University. The book is amply illustrated, the photographs showing the past and present teaching and research personnel of various departments.

H. F.

*BREEDING 575

1573. GIOVANNELLI, B. 575:007(45)
Nazareno Strampelli (29 Maggio 1866-23 Gennaio 1942). (Nazareno Strampelli, 29 May 1866-23 January 1942).
Genetica Agraria, Roma 1946 : 1 : 5-8.

In a brief appreciation of the life and work of this famous Italian plant breeder, it is pointed out that his great achievement was in recognizing the fact that, by genetical improvement, the local early maturing races of wheat and other plants could be made disease resistant and superior in cultural and industrial qualities. His immense attainments in the production of new and improved varieties have all followed upon this.

1574. NICOLAISEN, W. 575:633(43)
Die Pflanzenzucht in der Erzeugungsschlacht. (Plant breeding in the battle of production).
Forschungsdienst 1944 : 17 : 499-512.

A general review is given of the history and organization of plant breeding in Germany, attention being paid also to testing methods, varietal registration and the connexion between theoretical and practical studies. The principal objectives of German plant breeding are high yield, superior quality and disease resistance.

The author discusses the work done with potatoes to obtain varieties resistant to *Phytophthora*, viruses, wart and Colorado beetle, the use of South American species being mentioned. Attention has also been concentrated on cereals, on the oil crops, rape, poppy, linseed and soya bean, and on the fodder crops, maize, clover, lucerne, forage grasses and sweet lupin.

1575. SCHIEMANN, E. 575:633(43)
Die Genetische Abteilung des Botanischen Gartens in Dahlem. (The Genetics Section of the Botanical Garden at Dahlem). 575.42:578.08
Notizbl. Bot. Gart. Mus. Berlin-Dahlem 1940 : 15 : 145-63.

An account is given of the demonstrations with living plants of (1) the fundamental principles of genetics, including mutation, modification, hybridization, sex inheritance, species formation and plasmatic inheritance; and (2) the phylogeny of cultivated plants, including rye, potatoes, field beans and flax. Sections on primitive agriculture are included, also sections on population genetics and selection, mainly from the aspect of technique.

E. W.

* General studies, see also individual crops.

1576. BONVICINI, M. 575:633(45)
Problemi organizzativi della genetica agraria. (**Problems of organization in plant breeding**).
Genetica Agraria, Roma 1946 : 1 : 112-15.
A plea is made for the concentration of plant breeding activities at a few centres with adequate facilities, both in men and material, for both the genetical and the applied sides. An outline is given of the fields of investigation that ought to be included and of the type of training required for the personnel.

1577. At the U.S.S.R. Lenin Agricultural Academy (Moscow). 575:633(47)
Agriculture, Moscow 1945 : No. 12 : 1-8. (Mimeographed).
Brief summaries are given of the work of the different research institutes of the Lenin Agricultural Academy during 1945. In addition to the varied task of restoring collections and orchards, and of seed production, etc., the following work is reported:—

Wheat

Work is in progress at the Institute of Selection and Genetics to develop a method of obtaining higher yields of winter wheat by means of free pollination of separate grades with a pollen mixture of the best varieties of native and foreign selections.

Rye

A new variety of winter rye, Belozernaya or White Grain, has been obtained at the Novozybkov Experimental Station.

Barley

The new barley variety, Armavir 593, produced at the Kuban Experimental Station, was planted on a large scale for seed increase.

Millet

A new white-seeded, thin-husked variety has been developed at the Novozybkov Station.

Lupin

The production of the new variety, G-49, is reported at the Novozybkov Station; it is white-seeded, low in alkaloid content and suitable for fodder. Two new varieties of low-alkaloid, yellow fodder lupin, and an alkaloid free, narrow-leaved lupin, known as Whiteseed, have also been developed.

Potato

Summer planting of potatoes in the southern region of the U.S.S.R., as proposed by T. D. Lysenko, has been resumed.

A-358 and A-40 are new varieties raised at the Novozybkov Station.

Fruit

Grafts of a hybrid obtained by P. H. Yakovlev at the Michurin Central Genetic Laboratory from a cross between the Chinese plum and peach were distributed to different regions. Yakovlev also grafted a hybrid ashberry* to a pear and obtained a fruit with a sharply changed morphological structure. The number of fruit-bearing hybrids secured in the attempt to cross the apple and pear rose from two in 1944 to 12 in 1945.

Approximately 20 new apple seedlings have been raised, which are well adapted to severe climatic conditions and possess a flavour superior to that of the standard varieties.

1578. Horticulture and vegetable growing. 575:633(47)
Agriculture, Moscow 1945 : No. 9 : 7-10. (Mimeographed).
The following items of interest are reported: (1) the preliminary work of investigating the adaptability of various crops to conditions in subtropical Central Asia is now complete; (2) a Central Ampelographical Commission has been set up for the testing and approving of grape varieties; (3) Canadian plums, grown in the Omsk region since 1912, have received attention; and (4) experiments on vegetable production at high altitudes in the Altai region are in progress.

* ? *Sorbus* sp.

1579.

575:633(47)

Plant breeding.

Agriculture, Moscow 1945 : No. 6 : 3-6. (Mimeographed).

The growing of grapes on an industrial scale in the central and eastern regions of the U.S.S.R. has been planned. The varieties bred by Michurin are to be used in the new vineyards.

A summary is given of paper by the late A. A. Schmuck on biochemical processes in grafted plants (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 138).

The successful acclimatization of lastoven*, a perennial rubber-bearing plant, is reported from the Kursk region. The leaves contain up to 7% rubber, and the seed contains about 25% oil content. Considerable quantities of nectar are to be found in the flowers. The fibre of the plant is of industrial value.

Hybrids from crosses between aromatic and frost resistant strawberries grown at Alma-Ata are reported to be doing well in the United States.

Mixed potato plantings of an early and late variety may result in an increased yield of 87.7 quintals per hectare, owing to the greater density of planting made possible by the method.

1580.

575:633(47)

Plant industry. 2. At the Lgov Plant-breeding Station.

Agriculture, Moscow 1945 : No. 5 : p. 5. (Mimeographed).

Work at the Lgov Plant Breeding Station has resulted in the production of the spring vetch variety, Lgov 30-292, the oat variety, Lgov 36-229, and several high quality varieties of sugar beet. The new spring vetch is recommended for cultivation in 39 regions of the U.S.S.R. The oat variety is equal in yield to the well-known variety Pobeda. At present, work is concentrated upon the production of new varieties of sugar beet and the crops used in rotation with sugar beet.

1581.

575:633(48.5)

†Årsberättelse över Sveriges utsädesförenings verksamhet under år 1944.

(Annual Report on the work of the Swedish Seed Association 1944).

Sverig. Utsädesfören, Tidskr. 1945 : 55 : 247-328.

The work of the Association was further extended in 1944; generous grants were received from official and from private sources including funds for the work in progress on *Taraxacum Kok-saghyz* and for the work on flax and hemp; the Ugerup experiment farm was enlarged and particulars of the trials there are to be published.

The new varieties and élites released in 1944 to the Allmänna Svenska Utsädesaktiebolaget (General Swedish Seed Co., Ltd.) and the Svenska Sockerfabriksaktiebolaget (Swedish Sugar Factories Co.) included the following: the winter wheats Vrm 01134, a new variety from 0912 x Svea I and intended to replace Pärl (Pearl); U 01392, an Ultuna variety from Ergo x Gluten and almost as winter hardy as Ergo and with a high hectolitre weight; and Å 0846, a new variety from Thule II x Sammet, raised at the Västernorrland Station, and equal, so far, to the land wheat in winter hardiness, while at the same time much higher yielding and stiffer strawed; the winter barley Sv 38/14b, a new variety from the cross Mansholts x Pommerskt Nordland; two new élites of the spring wheat Svalöfs Progress, 01035d₁ and 01035d₂; the oat variety 01537 from Stjärn (Star) x Örn (Eagle); the new white, green-topped fodder mangel No. 048; the bitter blue lupin 0650, a relatively early ripening selection from an older commercial strain, and suitable for green manure and for ensilage; the new lines of spring rape 0201 and 0202 from Svalöfs Regina; and the winter turnip rape variety 0102, a selection from Lembke's winter rape. Detailed reports from the branch stations, the three new sub-stations and from the Legume Division of the Swedish Seed Association are appended to the main report. The following information is derived from the detailed report on the work at Svalöf:—

Spring Wheat

While following the same lines as hitherto, breeding operations were concentrated specially on baking quality, yield, strength of straw and earliness. The highest yield was obtained from variety 0978d (from 0843 x Aurore).

* *Asclepias* sp.

† An extended summary of this paper is on file at the Bureau.

Winter Wheat

Again the results of the selection carried out in the winters of 1939–42 were confirmed by artificial freezing experiments.

Damage by hares occurred mostly among the most winter-hardy varieties owing to the higher sugar content of their leaves and shoots.

The highest yields in the larger variety trials were obtained from W's Eroica, 01300 (from 0984 x Roter Kolben (Red Club), 01293b₂ (from Åring I x 01090a) and W's Ergo.

Oats

Promising new combinations are being intensively studied at Svalöf and at branch stations in south-western Sweden.

Crosses between the white varieties Stjärn, Sol II, Seger (Victory) and Guldregn on the one hand, and the particularly early Gopher, Kytö (from Finland), Vidar, etc., on the other, have been made on a large scale to obtain early varieties suitable for the inland and higher lying districts, and having stiff straw combined with high yield of grain.

The white oat Sv 38/367, from 01422 x 01430, yielded 5600 kg. per ha. of grain of very good quality.

The central Swedish black oat Extra-Klock (Extra-Bell) gave the highest yield of grain, while among the early black oats 01331c (Orion III) did best, with the variety Same next. Marked varietal differences were observed in the amount of damage done by spring and summer frit fly.

Spring rye

In trials at Svalöf and Ugerup a few of the new lines yielded better than their parents.

• Winter rye

Winter hardiness, stiff straw, high grain yield and quality were again the chief breeding aims.

Maize

As in the previous year, selection and hybridization to obtain early high yielding varieties were the more important breeding operations. Most of the material had been transferred to Ugerup, but smaller experiments have been run at Svalöf and Brandeborg. As a result of unfavourable environmental conditions, the best variety at Svalöf gave only 3493 kg. per ha., and at Ugerup 3072 kg. per ha.

Barley

In final tests of the two-rowed material from the malting barley crosses Maja x Freja and Maja x Sv 34/22, line Sv 40/13b₁, with a yield of 5900 kg. of grain per ha., was put on the market as Svalöfs Ymer in 1945. Line b₇ from Ymer gave the highest yield of all, 6260 kg. per ha.

A series of lines from the crosses Primus x Asplund and Juli x Asplund gave high yields, those from the former cross having very strong straw.

The winter barley lines from Sv 38/14, derived from Mansholt x Pommerskt Nordland, gave the highest grain yield, over 5000 kg. per ha.

Herbage Plants

Much work was done on seed production and also on flowering, fertilization and seed setting in red clover.

Resistance to clover rot was recorded; the more resistant strains gave very high yields and Merkur retained its place as the most persistent variety under the prevailing conditions. Some tetraploid red clover strains of special interest are now being tested on a larger scale, all three having proved considerably superior to the diploids in the tests. Selection of red clover hybrid progenies was continued. Crosses of alsike and group crosses of inbred lines of timothy were made.

Inbreeding of red fescue, and inbreeding and strain tests of *Alopecurus*, yellow lucerne, white clover and *Bromus inermis* were continued. At Ugerup, selections of yellow lucerne and *Lotus corniculatus* were examined and some interesting types of yellow lucerne for use in breeding were found.

Triploid red clover strains held their own in trials with diploids and averaged 14% more green stuff as compared with diploid Merkur. Tetraploid alsike and octoploid timothy strains are undergoing trials. In the progeny of twin plants of timothy, types were noted with the somatic chromosome number ranging from 21 to over 90. A plot has been laid down with 600 timothy plants of known chromosome number and grouped into 10 lots according to the euploid numbers from 3x to 13x.

Lupin

A new pure bred bitter blue lupin with high yield, early ripening capacity and hence good reliability was released to the Seed Company. The new sweet lupin lines from blue sweet lupin x blue bitter Lupin have proved so good that no further work on bitter blue lupins is needed. Studies of sweet lupin lines from yellow sweet lupin x yellow bitter lupin, of X-ray irradiated plants and of vernalization are proceeding.

Root Crops

Seed raising in the greenhouse with electric lighting at night was used in crossing of Barres and in the production of club root resistant turnips and swedes.

Tetraploid sugar beets gave approximately the same yield of sugar as the diploids. The sexual progeny of the first tetraploid turnips are being tested.

A haploid sugar beet derived from a colchicine treated plant is being examined.

Potatoes

Quality investigations were continued. Special studies were made of (1) the development of the root system and its relation to drought resistance and (2) secondary growth in autumn.

Six new élites have apparently been successfully raised from material tested for virus in the greenhouse by sap inoculation on tobacco.

Textile plants

Among the promising new fibre flaxes obtained by hybridization and selection, No. 0220 is cited as combining high yield with stiff straw. The oil flax Atlas suffered from rain during maturation, but a new line 01040 from a land flax Studina in Rumania proved promising.

The tetraploid flax and linseed material included 250 F₅ families from crosses between different strains, and also an experiment to test tetraploid strains and hybrid populations from the technological aspect.

The hemp did tolerably well, the best being Sv 40/742 from a land variety from Moldau in Rumania. Work is continuing on hermaphrodite hemp, *Abutilon*, *Asclepias*, *Urtica* and *Yucca*.

Tobacco

Work has been almost entirely concentrated on selection in the F₂ and F₃ from crosses between Havanna 236 and either Judy's Pride or Station Standup Barley and in the Swedish strains Tofta, Per Pers and Fjälkinge.

Poppy

Continued comparative experiments with poppies included foreign varieties and a good deal of breeding material. The object is to breed a type that is early, high yielding, stiff strawed and possesses closed capsules when ripe.

Hops

Efforts are being made to evolve high quality varieties suitable for Swedish conditions. In selection special emphasis is laid on the time of ripening, and varieties differing in earliness are being sought to facilitate harvesting.

Oil Plants

The turnip rape Sv 01 proved more resistant than others to pollen beetle. Plots of *Carthamus* and *Madia* have also been laid down. The aim in sunflower breeding is to obtain early, high yielding varieties that are not too tall, and have a low husk percentage.

In tests of tetraploid rape, turnip rape and white mustard, the last named alone yielded somewhat more than the diploid. The cultivated strains of tetraploid white mustard yielded about 20% less than the diploid, though the best was only 7% lower.

Rubber bearing plants

Selection of *Taraxacum Kok-saghyz* is proceeding on the basis of rubber content determinations, and seed is being raised in the greenhouse with artificial lighting.

Legumes

The Munk culinary pea gave the highest yield, 3290 kg. per ha. Work is recorded on fodder peas, sweet vetch, field beans and brown seeded beans.

Soya Bean

Experiments are now in progress at Ugerup, Gotland, Kalmar, Svalöf, Skara, Linköping and Ultuna. Some of the mutant forms induced by X-rays seem to have stiffer stems and to be earlier than the original varieties. Some specially early aberrant types were discovered; some lines ripened by 6 September.

1582.

575:633(48.5)

Akademiens sekreterare: Årsberättelse för 1945. (Academy of Agriculture, Secretary's report for 1945).

K. LantbrAkad. Tidskr. 1946 : 85 : 13-32.

Most of the research on crop improvement in Sweden, e.g. the production of new varieties of textile and oil plants and of dandelion and soya bean, briefly mentioned in this report as supported by the Academy, has also been cited in other publications regularly reviewed in *Plant Breeding Abstracts*. The subjects and problems undergoing investigation are: species formation; systematics and the cytogenetics of *Phleum* spp. (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1279); sweet lupin improvement and cultivation, including Tedin's work on his new early blue form at present undergoing test; the cultivation value of red clover strains; winter hardiness of clover and lucerne; *Medicago* interspecific crosses; and cytological phenomena in apples with reference to breeding.

The new research journal of the Academy, *Acta Agriculturae Suecana*, is also mentioned.

1583. ÅKERMAN, Å.

575:633(48.5)

Sveriges utsädesförening inför det nya verksamhetsåret. (The Swedish Seed Association confronts the work of the new year).

Sverig. Utsädesfören. Tidskr. 1946 : 56 : p. 2.

Work bearing on the adaptation of varieties to new requirements resulting from the mechanization of agriculture will be extended, also work on the technique of quality determinations. Breeding of oil and textile plants will proceed as planned and the new flax laboratory will work to capacity on quality estimations.

Comparative trials with artificially obtained high chromosome forms of rye, red clover, root crops and oil plants are to be carried out in the coming year. Various new buildings and a new experiment farm, Nygård near Ölfvingstorp, for the Kalmar Branch Station have been acquired.

1584. TÖRNQVIST, G. I.

575:633(48.5)

Några resultat av verksamheten vid Sveriges Utsädesförenings Ovre-Norrlandsfilial. (Some results of the work of the Upper Norrland Branch Station of the Swedish Seed Association).

Sverig. Utsädesfören. Tidskr. 1945 : 55 : 397-404.

This lecture given at the annual meeting of the Swedish Seed Association at Luleå in July 1945 outlines the development of the work of the station in breeding varieties of cereals, grasses and pulses. Varieties whose origin and history are given include Vega and Edda barley, Orion and Same oats, Tidig Gulärt (Early Yellow pea), Bottnia Gråärt (Bottnia Grey pea) and Bottnia timothy and meadow fescue.

1585.

575:633(49.2)

Negentiende beschrijvende rassenlijst voor landbouwgewassen. (19th descriptive variety list for agricultural plants).

Inst. Plantenveredeling, Wageningen 1943 : Pp. 148.

Twintigste beschrijvende rassenlijst voor landbouwgewassen. (20th descriptive variety list for agricultural plants).

Ibid. 1944 : Pp. 200.

Een en twintigste beschrijvende rassenlijst voor landbouwgewassen. (21st descriptive variety list for agricultural plants).

Ibid. 1946 : Pp. 221.

Three more issues (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1123) of this valuable Dutch manual for the use of growers and breeders of economic plants have now been published. Dorst, Veenstra, Groenewolt and Wind, working in collaboration with a newly appointed government committee, assisted by the new Instituut voor Rassenonderzoek van Landbouwgewassen (Institute for Research on Varieties of Crop Plants), have been responsible for this compilation. The effects of the regulation of 1941 dealing with the production of seeds and plants in Holland are discussed.

The 1946 issue contains a useful key to the contents for the use of English readers, the issue for 1943 contains similar information in German.

No list could be issued in 1945.

1586.

575:633(73)

Report of the Secretary of Agriculture 1944.

Washington, D.C., 1944 : Pp. 196.

An account is included of the main achievements of plant breeding during 1944.

1587.

575:633(73)

Report of the Secretary of Agriculture 1945.

Washington, D.C., 1946 : Pp. 167.

A general review is included of the main results of plant breeding investigations during 1945.

1588.

575:633(74.6)

Annual Report for the year ending October 31, 1942.

66th Rep. Conn. Agric. Exp. Sta. 1942 (1943) : Bull. No. 468 : 53-95.

Maize

Hybrid production is reported.

Strains of long inbred lines continue to show small degenerative changes such as reduced height, light green colour, narrow leaves and visible lethal changes, which are completely recessive and do not effect the vigour of the hybrid progeny. The fact has important bearing upon the theory of hybrid vigour.

Growth changes associated with spontaneous aberrations in the *Bt* and *Pr* region of chromosome 5 of the endosperm are being studied.

Pepper

The new variety Charter Oak is to be released in 1943. It is characterized by earliness of maturity, productivity, a dark green colour and thick flesh.

Strawberry

New varieties have been developed by inbreeding and crossing.

Squash

F_3 hybrid selections have been developed which are earlier in maturity than Yankee Hybrid. The search for a plant with sterile pollen which would facilitate the production of F_1 hybrids was continued. A line with pollen which is so oily that it sticks together and will not adhere to the legs of pollinating insects may prove useful.

Tomatoes

A promising new strain, Connecticut No. 3, deep red in colour and slightly earlier in maturity than the standard types, is to be extensively tested.

Sweet corn

A brief account is given of the series of hybrids developed in recent years which, planted at the same time, show successive dates of maturity so that the crop can be picked throughout the season. All Connecticut hybrids are bacterial wilt resistant. Breeding for smut resistance has been begun.

1589.

575:633(74.6)

Report of the Director for the year ending October 31, 1943.

67th Rep. Conn. Agric. Exp. Sta. 1943 (1944) : Bull. No. 477 : 39-82.

Maize

Hybrid production is reported.

Study of inbred lines showing small degeneration changes which do not effect the vigour of the hybrid progeny was continued. The variation in continuously selfed inbred lines was studied. A further study was made of growth changes associated with spontaneous chromosome aberrations in the *Bt* and *Pr* region of chromosome 5 of the endosperm.

Pepper

Mosaic resistance is to be imparted to the new variety Charter Oak.

Strawberry

The new varieties, Shelton, Hebron, Bristol and Branford, developed in the programme of inbreeding and crossing, are now being grown in the north-east of the state.

SquashWork on the production of F_1 hybrids continued.

Cucumber

Two lines resistant to downy mildew are being crossed with commercial varieties.

Tomato

The new strain, Connecticut No. 3, has given promising results in growers' trials. In yield it equalled Pritchard, Rutgers and Stokesdale.

Sweet corn

The work of producing hybrid series with successive maturity times was continued.

1590.

575:633(75.3)

Year book of the Carnegie Institution of Washington 1941-1942 (1942) :

No. 41 : Pp. 309.

Demerec, M. *Department of genetics. (pp. 169-76).*

A survey is given of the work of the Department of Genetics since its establishment about 40 years ago.

McClintock, B. *Maize genetics. (pp. 181-86).*

Investigations on the behaviour of the broken ends of chromosome 9 in maize, and on the phenotypical effect of an allelic series of homozygous deficiencies in the short arm of this chromosome were continued. Small terminal deficiencies result in pale yellow seedlings, and white seedlings are produced when the terminal deficiency is slightly longer.

Warmke, H. E. *Polyplody investigations. (pp. 186-89).*

Preliminary work on *Taraxacum Kok-saghyz* is reported. The species has been found to be (1) a basic diploid of the genus, with $2n = 16$, (2) self-sterile and fully cross-fertile, and (3) normal in both male and female gamete formation. Colchicine-treated plants are being grown in an attempt to obtain tetraploids.

Wide variation in marihuana content has been found among superior fibre strains of *Cannabis sativa*. Triploid and tetraploid forms, derived from the same original diploid strain, had a higher marihuana content than the diploids. The triploids, however, were consistently higher in the drug content than the tetraploids.

Demerec, M.,

Kaufmann, B. P.,

Fano, U.,

Sutton, E. and

Sansome, E. R. *The gene. (pp. 190-99).*

Genetical studies in *Drosophila* on the following subjects are reported: (1) a gene causing increase in the rate of mutability; (2) the effect of supplementary radiation on induced chromosome breakage and recombination; (3) the investigation of a possible correlation between phenotypic variation due to gene translocation to heterochromatin and the differences in absorption of ultraviolet radiation by the chromosome bands with which these genes are associated; (4) the possible effect of food containing heavy water upon the structure and activity of the gene; and (5) the induction of lethal recessives by treatment with X-rays and neutrons. Investigations on the effect of X-ray and ultra-violet treatments on *Neurospora crassa*, and investigations on the giant chromosomes in the mosquitoes, *Culex pipiens* and *Aedes aegypti*, are also reported.

1591.

575:633(75.3)

Year book of the Carnegie Institution of Washington 1942-1943 (1943) :

No. 42 : Pp. 208.

Demerec, M. *Department of genetics. (pp. 123-26).*

A review is given of investigations carried out by the Department of Genetics during 1942-3.

Demerec, M.,

Kaufmann, B. P.,

Fano, U.,

Sansome, E. R. and

Gay, H. *The gene. (pp. 139-47).*

The effects of ultraviolet radiation on mitosis has been studied in various kinds of animal material. Study of the effect of supplementary radiation on induced chromosome breakage and recombination in *Drosophila* has been continued. The time-intensity factor in radiation

dosages and the genetic effect of X-rays by means of large ion clusters have also been investigated. Continued experiments on induced mutations in *Neurospora crassa* have shown that the frequency of X-ray induced mutations increases in proportion to the dosage, even in the case of very high dosages. The curve of mutations induced by ultraviolet radiation, however, was found to reach a certain peak and then to decline.

McClintock, B. *Maize genetics.* (pp. 148-52).

Further investigations on breakage and fusion in chromosome 9 of maize suggest that the healing process may depend upon the nuclear cycle. Indication has also been obtained that a relatively large amount of crossing-over may occur between the loci of two mutants situated close to each within a chromosome segment. A method utilizing differential pollen-tube growth is described by means of which a greatly increased number of plants with broken chromosomes can be secured. Plants homozygous for segmental deficiencies of the short arm of chromosome 9 arising independently after breakage, show mutant characters as a result of these deficiencies. Two types of deficiency mutants, pale yellow seedlings and white seedlings, have been isolated, which together with the normal character of green seedling form an allelic series related to the length of the deficiency. Thirteen of these mutants are under investigation.

Warmke, H. E. and

Davidson, H.

Polyplody investigations. (pp. 153-57).

Fertilization in *Taraxacum Kok-saghyz* occurs about 30 minutes after pollination. Continued studies on self-sterility have revealed a high degree of end-season fertility. Differences between tetraploids, triploids and diploids are described. Both polyploids retain the normal self-sterility and sexual behaviour of the diploid form, in contrast to the natural polyploid *Taraxacum* species which are reported to be apomictic. The tetraploid root has been found to be heavier than the diploid.

The marihuana content of *Cannabis sativa* has been found to be a genetic character. The greater drug content of polyploids in comparison with diploids, reported in the previous year, has been confirmed. Tetraploid strains have shown no superiority in fibre over diploid strains; it is pointed out, however, that the tetraploid seed weighed heavier and therefore the test plots had comparatively fewer plants, the tetraploids thus being placed at a disadvantage in the tests. Tetraploid pollen grains tend to have a larger number of germ pores than the diploid grains.

1592.

575:633(75.3)

Year book of the Carnegie Institution of Washington 1943-1944 :
(1944) : No. 43 : Pp. 206.

Demerec, M. *Department of genetics.* (pp. 103-08).

A survey is given of studies carried out during 1943-4.

Demerec, M.,

Fano, U. and

Sansome, E. R. *The gene.* (pp. 108-14).

Investigations on bacteriophage resistant mutants of strain B of *Escherichia coli* are reported (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 925). Investigations on the production of strains of *Staphylococcus aureus* resistant to penicillin are also summarized (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 926). In experiments on the effect of ultraviolet radiation on the B strain of *E. coli*, a strain more resistant to this radiation than the original B strain was readily induced. The data suggest that a mutation independent of the ultraviolet treatment may be responsible for this increased resistance. Morphologically distinguishable mutants of *Penicillium notatum* were induced by X-ray treatment. Radiation experiments on *Neurospora crassa* are now complete. Studies on induced mutation in bacteriophages were continued. Mutant phages have been induced by ultraviolet treatment. Ultraviolet radiation was found to cause a marked delay in the reproduction of the phage; this is the first time a physiological non-hereditary effect of radiation upon viruses has been observed.

Kaufmann, B. P. *Cytology.* (pp. 115-20).

Studies on the linear organization of the chromosome and the location of intercalary heterochromatin in *Drosophila melanogaster*, and on the effect of ultraviolet radiation upon mitosis in animal material have been continued.

Dobzhansky, T. *Genetic structure of natural populations.* (pp. 120-27.)

Investigations carried out mainly during 1941-2 on the hereditary variability of natural *Drosophila* populations and its evolutionary significance are reported.

McClintock, B. *Maize genetics.* (pp. 127-35.)

Investigations on pale yellow seedling and white seedling mutants due to terminal deficiencies of the short arm of chromosome 9 were completed. Internal deficiencies in the short arm of chromosome 9 producing mutant characters are also under investigation.

Warmke, H. E. and

Davidson, H.

Polyploidy investigations. (pp. 135-39.)

Tetraploid roots of *Taraxacum Kok-saghyz* have a significantly greater mean root weight and a slightly higher mean rubber percentage than diploid roots.

Selection of *Cannabis sativa* for three generations has resulted in strains with a markedly reduced marihuana content. Studies on sex inheritance in diploids and polyploids indicate that the balance between male and female genes is such that XX , XXX , $XXXX$ individuals are female, XXY and XXY individuals are female or female-hermaphrodite, and XY , $XXYY$ and XYY individuals are male.

1593.

575:633(75.8)

Fifty-seventh Annual Report of Georgia Experiment Station of the University System of Georgia, July 1, 1944 to June 30, 1945 : Pp. 91.

Maize

An extensive inbreeding programme has been initiated for the production of adapted hybrids.

Cotton

Several Empire strains equalled or exceeded Coker 100 Wilt in wilt resistance. Breeding to improve the fibre tensile strength of wilt resistant cottons is in progress.

Peanut

Selection is reported.

The unnamed varieties, 207-3 and 18-59, were released to growers. The yield of both varieties compares favourably with that of Spanish. The variety 18-59 is a white-skinned type showing wide adaptability.

Spacing experiments are described.

Grapes

Two races of black rot (*Guignardia Bidwellii*) have been identified. Among the native grapes, the bunch type is infected by only one race, while only the muscadine grapes are infected by the other race. The European grape (*Vitis vinifera*) is highly susceptible to both forms.

Breeding work in muscadine grapes is reported.

Cantaloupe

In breeding for resistance to both downy and powdery mildews, resistant inedible cantaloupes have been crossed with several commercial varieties; promising back-cross strains have been selected. Crosses between two of the mildew resistant strains and the aphid resistant variety, Smith Perfect, are under investigation.

In the material used in breeding for resistance to downy and powdery mildew three flesh colour types have been noted, viz., green, salmon, and salmon green. Green flesh appears to be recessive. The data also suggest that round fruit shape is recessive to long, and dark skin to light.

Resistance to downy mildew appears to be a recessive character.

Water-melon

The small fruited wilt resistant strain S306 has been designated Georgia No. 2 and released for trial. It has a higher sugar content than several commercial varieties, and its eating quality is good. It is not suitable for transport, the rind being thin and tender. Breeding and selection for improved wilt resistant small-fruited strains has continued; some of the more promising strains are hybrids involving Georgia No. 2.

Tomato

Some *Lycopersicon esculentum* \times *L. pimpinellifolium* hybrids have shown freedom from *Fusarium* wilt, and a greater tolerance to nematode than commercial varieties. F_2 back-cross selections

have exhibited suitable commercial qualities. Strains of *L. peruvianum* are under test for nematode resistance.

Sweet corn

The variety Cherokee is being selected for the character of white cob.

1594.

575:633(75.9)

Annual Report of the University of Florida Agricultural Experiment Station, for the fiscal year ending June 30, 1943 : Pp. 224.

Oats

Breeding work is in progress. The new oat, Florida 167, developed from a cross between Bond and Fulghum, is to be released. It is rust resistant, gives heavy yields of grain, and is suitable for grazing.

At the North Florida Station, Lee x Victoria selections gave good yields and were highly resistant to leaf rust and smut.

Maize

Hybrid breeding is receiving attention.

Forage crops

Selection of Napier grass (*Pennisetum purpureum*), pearl millet (*P. glaucum*), sorghum, Sudan grass and lupin (*Lupinus angustifolius*) is reported.

Observations were made on the frost resistance of many grass species at the Everglades Station, and several species were analysed for ascorbic acid content.

Sugar cane

Selection work at the Everglades Station in the series F35 to F41 is described; new crosses are reported.

Tobacco

Selection for nematode root-knot resistance in flue-cured tobacco is in progress. At the North Florida Station, breeding work for blackshank and root-knot resistance is being conducted.

Papaya

Breeding work is reported at the Sub-tropical Station.

Peanut

Crosses involving Spanish, Rasteiro, Florida Station hybrids and Virginia Bunch were effected.

Celery

Cornell celery hybrids were selected for resistance to early and late blight at the Everglades Station.

Water-melon

Breeding for *Fusarium* wilt resistance is in progress.

Tomato

Crosses were made between *Fusarium* wilt resistant F₁ hybrids and mosaic resistant F₃ plants of the cross Indiana Baltimore x *L. hirsutum*. Several of the F₁ hybrids showed promising commercial characters. Attempts are being made to combine the collar rot resistance shown by some of the Indiana Baltimore x *L. hirsutum* hybrids and certain other tomato lines with *Fusarium* wilt resistance. Resistance to the root-knot nematode is also receiving attention. *L. peruvianum* exhibits marked resistance to the pest. Nos 123 and 196, selections combining hairiness and stickiness, are being propagated, in the hope that they will prove unattractive to aphids.

At the Everglades Station crosses have been carried out to combine resistance to *Cladosporium*, *Fusarium* and *Alternaria*.

Egg plant

The *Phomopsis* blight resistant egg plant varieties, Muktak and Bengan, have been crossed with commercial varieties.

Cowpea

A strain of the Concha cowpea has shown resistance to the root-knot nematode.

Beans

Breeding for rust resistance is reported at the Everglades Station.

1595.

575:633(75.9)

Annual Report of the University of Florida Agricultural Experiment Station, for the fiscal year ending June 30, 1944 : Pp. 214.

Maize

Theoretical work on hybrid vigour is reported. A modified breeding method has been designed in which selection within cross-bred material for combining ability with a specific homozygous line is practised recurrently.

Forage Crops

Selection of Napier grass (*Pennisetum purpureum*), sorghum, lupins, and hairy indigo (*Indigofera hirsuta*) has been continued. A strain of *Lupinus albus* free from alkaloid and giving satisfactory yield has been obtained. Disease resistant selections of *L. angustifolius* are under observation.

Sugar cane

Breeding and selection work at the Everglades Station is summarized.

Tobacco

Crosses are being made between *Nicotiana repanda* Willd. and common flue-cured varieties. *N. repanda* has proved to be highly resistant to root-knot nematode. At the Everglades Station selections were tested for resistance to black shank and root-knot.

Pepper

A new variety has been released under the name of Manatee Wonder (cf. *Plant Breeding Abstracts*, Vol. XIV, Abst. 771).

Papaya

At the Sub-tropical Station, breeding work was continued.

Peanut

Strain 231-51, derived from a cross between Dixie Giant and Small White Spanish, has been named Dixie Runner (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 1495).

Celery

Many lines of Cornell hybrid celery exhibit considerable resistance to early blight.

Water-melon

Fusarium wilt resistance trials were conducted.

Tomato

Hybrid lines were tested for *Fusarium* wilt resistance. Progress in combining resistance to mosaic, early blight, grey spot and root-knot with wilt resistance is reported; the F₁ hybrid line, M190, shows particular promise. Further breeding for disease resistance is reported at the Everglades Station.

Egg plant

Breeding for resistance to *Phomopsis* blight continued.

Beans

At the Everglades Station breeding for disease resistance, including rust resistance, was continued.

1596.

575:633(76.7)

Science points the way.

56th Rep. Ark. Agric. Exp. Sta. 1944 : Bull. No. 453 : Pp. 35.

Oats

Traveler is a new variety developed from the cross Victoria x Custis. It is resistant to rust and smut and winter hardy. The variety is recommended for grain production and winter pasture.

Rice

Data are given on the new varieties, Zenith, Arkansas Fortune, Prelude and Arkrose, released during the period 1936-41. The production of a variety with long slender grain, early enough to mature in Arkansas, is in progress.

Cotton

Strains with spinning qualities superior to those of the commercial varieties tested have been developed.

Pear

The Richard Peters variety has proved to be blight resistant. In quality it resembles Bartlett.

1597.

575:633(77.1)

Farm science and practice.

63rd Rep. Ohio Agric. Exp. Sta. 1944 (1945) : Bull. No. 659 : Pp. 197.

Wheat

Lines of the new variety Thorne (cf. *Plant Breeding Abstracts*, Vol. X, Abst. 725) showing increased weight per bushel and less susceptibility to scab than the original variety are under test. In breeding for quality, use is made of the mixogram method to test small grain samples in the early stages of breeding.

Maize

Hybrid production is in progress.

Potato

The new variety Erie has outyielded other late varieties (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 1053).

Breeding for leaf hopper resistance is in progress. The progenies which have shown most resistance are hybrids involving Sequoia, Katahdin, President, 336-18 and 336-144.

Apple

The new variety Melrose has been developed from a cross between Jonathan and Delicious. It is a late maturing and late keeping apple, and the flesh and flavour are of good quality.

Onion

Thrips resistant lines have been secured, which are now being crossed with standard varieties. Glossy foliage is associated with thrips resistance.

Cucumber

Varietal tests of reaction to *Erwinia tracheiphila* were carried out. Klondike, Marketer, Mincu, Stays Green, Taxpayer and Vickery were among the least susceptible varieties.

Tomato

Breeding work has as its aim the production of three *Fusarium* wilt resistant types, viz., a pink type for glasshouse cultivation, a red tomato for market gardening, and a canning tomato. Work has been continued on the development of differential lines to be used in the determination of the two physiologic races of *Fusarium* wilt, the common and new Ohio races. Attempts to cross the wild species *L. peruvianum* var. *humifusum* with commercial varieties have been continued with some success; the former species possesses a high degree of disease resistance and a high ascorbic acid content. F_1 seedlings have been obtained.

Varieties were tested for susceptibility to anthracnose.

Beans

Observations on the susceptibility of garden, field and Lima beans to the pale-striped flea beetle, leaf hopper, thrips and weevil are reported.

1598.

575:633(78.2)

Greater farm production for Nebraska.

56th Rep. Neb. Agric. Exp. Sta. 1943 : Pp. 95.

Wheat

Data are given on the new Pawnee variety, derived from the cross Kawvale x Tenmarq (cf. *Plant Breeding Abstracts*, Vol. XIII, Abst. 1200).

Oats

A new selection, Victoria x Richland (C.I. 3314), originally developed at the Iowa Experiment Station, has been named Cedar and increased for distribution (cf. *Plant Breeding Abstracts*, Vol. XIII, Abst. 1130). It outyields the newer varieties, Marion, Boone and Tama, and is resistant to crown and stem rust and smut.

Maize

Hybrid production is reported.

The new open-pollinated variety, Nebraska Waxy, has been developed by successively out-crossing a hybrid between a Chinese waxy type and standard Yellow Dent with various high

yielding dent varieties, and selecting after each out-cross for the recessive waxy kernel character. Wide variation was observed in hybrid susceptibility to ear rot damage, caused chiefly by *Diplodia Zeae*, *Nigrospora sphaerica* and *Fusarium moniliforme*.

Sorghum

Breeding work to introduce the waxy character into the standard Nebraska grain sorghums was begun.

Forage grasses

Improved strains of various grasses have been selected and increased for distribution.

Sweet clover

The attempt to extend the time of maturity of *M. officinalis* into autumn has continued. Hybridization between the high yielding Madrid variety (*M. alba*) and aberrant, very late maturing and low yielding yellow sweet clovers, forms the basis of this work; the material is now in the F_2 .

The possibility of combining the character of low coumarin content with other desirable characters is being investigated. Crosses between the low coumarin Pioneer variety and high yielding strains showing better adaptation than Pioneer are now in the F_2 .

A new synthetic variety consisting of a combination of inbred lines is to be further tested. The inbred lines are distinguished by a marked fineness of the stem and leafiness; the synthetic strain appears to possess superior seedling vigour and good seed producing capacity.

The use of naphthalene acetamide for inducing self-fertility in *M. officinalis* was investigated. Use of this substance did not result in an increase in the production of selfed seed; it tended, however, to prevent the shedding of the floral parts.

Potato

In conjunction with the Minnesota Experiment Station a promising selection is to be introduced under the name of Kasota (cf. *Plant Breeding Abstracts*, Vol. XIII, Abst. 1274).

Two types of periclinal chimaeras were obtained by treating seedlings with colchicine. One type possessed an octoploid epidermis and tetraploid internal tissues; the reverse distribution of tissues characterized the second type. Vigour was found to decrease as the volume of octoploid tissue increased.

Raspberry

Attempts are being made to obtain larger fruited raspberries by treating the diploid varieties, Cumberland and Latham, with colchicine.

Tomato

Selections from crosses between All Red and Break o' Day, All Red and Stokesdale, Danmark and Break o' Day, and Danmark and Self Pruning, show particular promise.

Varietal tests of resistance to bacterial spot are in progress. Tests for resistance to *Fusarium* wilt are also reported.

Beans

Breeding for resistance to common and halo blight continues.

1599.

575:633(78.2)

Nebraska agriculture 1943.

57th Rep. Neb. Agric. Exp. Sta. 1944 : Pp. 117.

Wheat

Further data are given on the new Pawnee variety (cf. *Plant Breeding Abstracts*, Vol. XIII, Abst. 1200 and Abst. 1598 above).

Maize

Hybrid production was continued.

Progress in the development of waxy maize is reported. Yellow and white waxy lines have been produced by inbreeding and back-crossing. A new open-pollinated white waxy variety, Nebraska Waxy No. 6, and a new open-pollinated yellow variety, Nebraska Waxy No. 5, have given higher yields than Nebraska Waxy (cf. Abst. 1598 above).

Barley

Hybrid Composite C.I. 7114, selected from Hybrid Composite C.I. 5461, may be valuable as a malting barley.

Sorghum

The development of an adapted waxy variety suitable for combine harvesting forms part of the waxy breeding programme. Leoti sorgo is being selected with the object of producing a variety pure for the waxy character, and more uniform in plant type.

Sudan grass

Selections of the hybrid Leoti sorgo x Sudan grass and local selections from common Sudan grass show considerable variation in resistance to chinch bug, growth type, rate of recovery after clipping, and prussic acid content.

Lucerne

Strains have been selected for resistance to the leaf hopper. The preliminary stages of the programme of F_1 hybrid production are in progress. An attempt is being made to develop a hybrid with high seed and forage yield, wilt resistance, winter hardiness, seedling vigour, and resistance to disease and insects. Lines possessing a dark green colour are being selected since it is believed that high protein and carotene content are associated with this character.

Sweet clover

Late maturing, vigorous selections have been obtained from crosses between Madrid (*Melilotus alba*) and late maturing, low-yielding yellow sweet clovers. Selection for low coumarin content was continued. Several crosses were obtained between the high-yielding species *M. alba*, with high coumarin content, and the low-yielding species, *M. dentata*, which is free from coumarin. Hybrids between these two species lack chlorophyll and are unable to grow beyond the seedling stage; they can, however, be made to develop to maturity by grafting. Further studies to determine the possibility of securing coumarin-free, high-yielding segregates from this hybrid are to be carried out.

The production of synthetic varieties continued.

Evergreen (*M. alba*) is being selected with a view to obtaining lines showing lateness of maturity, high yield and improved seeding capacity. Desirable lines are to be combined to form a new strain of Evergreen.

Potato

Several promising lines with red or white tubers are being increased for yield and commercial tests.

Safflower

The purification of varieties is in progress. Many selections with various degrees of spininess have been made and are under test for oil content and yielding ability. Crosses have also been made to obtain a combination of spinelessness, high oil content and yield.

Raspberry

Self-pollinated seeds have been secured from colchicine-treated Latham canes.

Tomato

A new variety selected from a cross between All Red and Stokesdale is to be introduced under the name of Red Cloud. The variety gives high yields of very early fruit. Another selection from the same cross has been named Sioux. It is a high yielding, mid-season tomato. Both varieties possess high vitamin C content.

In tests for reaction to *Fusarium* wilt, no lines showed a high degree of resistance but a number appeared to be tolerant to the disease.

Beans

Breeding for resistance to common and halo blight continues.

Soya bean

Breeding work is reported.

1600.

575:633(78.2)

59th Annual Report of the Nebraska Agricultural Experiment Station
1946 : Pp. 119.

Maize

Hybrid production is reported. Waxy maize breeding is in progress. Detasseling as a hazard in hybrid seed production was investigated (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 751).

Sorghum

Breeding for waxy types is in progress. Back-cross selections of the cross Western Blackhull x Day (Nebraska No. 45) show particular promise; these are moderately early types suitable for combine harvesting.

Forage grass

Pollination habits and distances of pollen dispersal have been studied in several species.

Forage legumes

Selections of *Lotus corniculatus* differing widely in vegetative characters are being used in hybridization work.

The value of the milk vetch (*Astragalus Cicer*) and crown vetch (*Coronilla varia*) is being investigated.

Selections of Korean lespedeza (*Lespedeza stipulacea*) show promise of combining earliness and wilt resistance.

Two new varieties of sweet clover have been developed. One is a fine-stemmed, leafy white-flowered variety which may be suitable as a hay type. The other is a very late maturing, yellow-flowered variety, provisionally named Rasmussen Late Yellow. The plants continue to grow until the late autumn of the second year. Its seed production, however, is poor. Sweet clover plants have been isolated which are quite low in coumarin but still within the toxic level. Coumarin content has been analysed at different stages of development. Pioneer, a non-bitter variety containing coumarin in a bound form, proved to be as toxic as the commonly grown bitter varieties.

Natural crossing blocks were established for the experimental production of F₁ hybrid lucerne. The method of selecting clonal lines is described. Data are given on the performance of the hybrid progeny of clonal lines. The value of the polycross in predicting general combining ability has been shown. A clone with large seed and easily tripped flowers is being used in breeding. Use is also being made of a clone with large seed and leaf hopper resistance.

Potato

Breeding is reported. Many red-skinned selections are to be extensively tested; some of these lines have tubers of good type and cooking quality. Selections showing promising scab resistance in comparison with Triumph have been obtained.

Castor bean

Breeding work aims at developing high yielding, non-shattering strains containing 50% or more of oil. A large number of selections were tested.

Sesame

Pure lines of white, brown and black seeded varieties are being produced. Natural cross-pollination occurred to the extent of 5-5.9%.

Safflower

Breeding was continued. Natural crossing ranges from 5 to 100%, various degrees of self-incompatibility existing.

Onion

Varieties and strains were tested for thrips resistance.

Tomato

Virus resistance was shown by the Pearl Harbor variety and a Nebraska selection from a cross between Bounty and Porter. Breeding for resistance to *Septoria* leaf spot is in progress.

Soya bean

New selections show promise.

1601.

575:633(78.8)

58th Annual Report of the Colorado Agricultural Experiment Station,
1944 (1945) : Pp. 52.

Wheat

Promising rust resistant strains have been developed; breeding for smut resistance was continued.

Oats

Smut resistant selections continue to show commercial promise.

Barley

Progress is reported in the production of a Lico type resistant to loose smut. Investigations on the location of genes in the linkage groups are being conducted.

Lucerne

Selection for yield and wilt resistance is reported.

Potato

Psyllid resistant strains continue to show commercial promise. The new seedling Hybrid 6341 exhibits high-yielding capacity and considerable resistance to scab.

Onion

The development of F_1 hybrids of the Sweet Spanish and Danvers type is receiving attention, use being made of male sterility (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 766).

Peas and Beans

Indication has been obtained that several strains exist of *Fusarium Solani* var. *Martii*, one of the fungi associated with pea rot.

Pinto bean lines have been tested for rust resistance.

1602.

575:633(78.9)

Fifty-sixth Annual Report of the New Mexico Agricultural Experiment Station 1944-1945 : Pp. 58.

Lucerne

A breeding programme for high yield and wilt resistance is planned.

Cotton

Breeding cotton of uniform quality for the irrigated areas of southern New Mexico is reported.

Onion

An attempt is being made to develop a White Grano onion resistant to pink root.

Beans

From the crosses Pinto x California Pink, Pinto x Calico, Pinto x Great Northern and Pinto x Strain 1334, it is hoped to produce a pinto-marked bean with improved cooking qualities. Tests of recently developed pinto bean strains are reported. Strains 295, 247 and 1388 show bacterial blight resistance.

1603.

BoZA BARDUCCI, T.

575:633(85)

Los progresos alcanzados por el Perú en genética vegetal. (**The progress achieved by Peru in plant genetics**).

Bol. Estac. Exp. Agric. La Molina 1945 : No. 27 : Pp. 34.

Maize

A study has been made of the principal varieties grown in both coastal and highland districts and of a number of imported varieties, and a start has been made on selfing the best varieties and finding the best parental combinations for producing hybrid seed; 28 out of 30 hybrids tested exceeded the standard variety in yield, the hybrid Estrella x Uhina Amarillo Cuzio by $2\frac{1}{2}$ times. A scheme has now been started for the production and sale of certified hybrid seed.

Rice

Three varieties, Minagra No. 1, Minagra No. 2 and Lambayeque No. 1, all selections from the Indian variety Baharrampur, have proved superior to the varieties previously grown. A number of other selections including several hybrids are now under observation.

Potato

An extensive collection of varieties, both domestic and indigenous, has been assembled. Most North American varieties are unsuitable for cultivation in Peru on account of their long photoperiod. Three promising seedlings have been selected from the variety Chata Blanca from Huancayo, and one of them seems to be resistant to *Rhizoctonia* sp., which is a serious pest of potatoes in Peru.

Cotton

The first plant breeding achievements mentioned in Peru are the selection by two private planters of two cotton varieties which have proved to be among the most successful in the country, namely Tangüis and Peruvian Pima. The various later selections of Tangüis that

have been put on the market are also briefly described. One of the best of these is the line LM No. 7-35, which is a month earlier than Tangüis and more uniform in ripening, producing 70-80% of its crop at the first picking; it has a ginning percentage of 39.2, very uniform, long lint of $1\frac{6}{16}$ " and $1\frac{1}{2}$ ", and is very brilliant, strong and somewhat smoother than Tangüis; the yield is 30-60% greater than Tangüis. A more recent selection of this variety, LM No. 117-381, has given still better yields and lint quality.

Some F_8 - F_{10} selections of Tangüis x Sakel and Tangüis x Giza 7 are specially promising among the long-lint group.

Several selections resistant to *Verticillium* wilt are undergoing multiplication and the selection work is being continued. One specially promising resistant selection is LM 12-40w, which has the following characteristics: (1) relative earliness, 84.5%; (2) great uniformity; (3) ginning percentage between 43.9 and 42.7; (4) lint index 9.1 grm.; (5) weight of raw cotton boll 4.89 grm.; (6) weight of lint per boll 2.11 grm.; (7) hundred seed weight 11.5 grm.; (8) number of seeds per boll 23; and (9) lint length $1\frac{11}{32}$ ". This variety excels the common Tangüis in all characters except lint length.

A world collection of cottons comprising some 450 specimens is maintained and special interest is still being attached to the work with the *G. Raimondii* x *G. hirsutum* hybrid.

Promising results are being obtained in breeding for resistance to attack by *Dysdercus ruficollis* L., and in the use of Harland's line mixtures in place of rigorous selections.

Selection in the variety Pima has led to marked improvements in both yield and fibre quality; certain types with double sympodia are expected to effect still further improvements in yield.

Flax

The local biotype of the flax rust (*Melampsora Lini*) has been identified as No. 42; improvements in resistance have been attained by selection, and crosses of the locally grown fibre flax varieties have now been made with the resistant oil variety Bombay and also with the variety Leningrad.

Sugar Cane

A certain amount of breeding has been done by commercial undertakings and two of the best varieties produced are C.E.C. (12) 7, obtained by César Echeandía Caulons from the cross P.O.J.2714 x H.109, and Peru 44, obtained by Schaeffer from Bourbon x P.O.J.2878.

Beans

Selection work has been started with a number of varieties of *Phaseolus* and other beans.

1604. BOEKHOLT, K.	575:633:575.3
Das Standortproblem in der Pflanzenzucht. (The problem of locality in plant breeding).	

Forschungsdienst 1944 : 17 : 449-54.

The author considers the tests of the State Food Board (Reichsnährstand) for cereals etc. when applied to much wider regions and wider climatic range than those for which these tests were originally designed. He suggests that, in future, the basis of these tests should be expanded to include regional breeding. Again since each variety is developed with a certain aim in breeding, the breeder should have some influence on the choice of the region in which he will have his new strain tested.

The author's plan is to have new strains first tested in the climatic regions of the North, Middle West, South and East, in comparison with the varieties showing the best performance there; then strains which passed these tests could, at request, be tested in other parts of the country. Thus, whilst a larger number of exact tests would have to be made, the promoter of them would not have to test so many new strains, the value of which in certain climates might be very dubious. Again, it seems essential that further experiments should be made on technical problems such as spacing, rate of seeding etc., in view of the different reactions of individual varieties of cereals, potatoes, beets etc. to the allotted spacing, and the differences in cereals as regards their capacity for using nitrogen. The author's plan would include testing the different strains simultaneously under varied conditions of cultivation to find the best for each strain (see Abst. 1605 below).

The author doubts whether Schlösser's scheme for preliminary testing of strains is feasible and observes that if each breeder worked with only a hundred strains, then a hundred breeding concerns would submit 10,000 strains for testing; moreover, the components of yield and the

growth rhythm in a variety are created by the climatic conditions which would have to be continually favourable.

The aim of the expanded government tests must be to develop regional breeding, so that the provision of pedigree seed is based on the best adapted strains of crop plants. E. W.

1605. SCHLÖSSER, L.-A. • 575:633:575.3(43)
 Landsorte—Hochzucht—Landeszucht. (**Land variety—pedigree breeding—regional breeding**).
Forschungsdienst 1944 : 17 : 343-49.

The problem discussed is the breeding of varieties of all crop plants suitable to every climate of Germany and of Europe.

The method of the State Food Board (Reichsnährstand) for testing varietal performance is described. The author points out that an important aspect of the above problem has not yet been investigated. Thus, in the final trials of the State Food Board, only a small number of new varieties, submitted for admission, are tested in regions of widely varying climate, but the more important initial families, or the first selections from segregations from crosses of isolated strains and collateral strains, are not so tested in varied climates; again, in all plant breeding concerns, the first trials of the newly created progenies are always made in small multiplications, the greater part of the strains for test each year being rejected, only a small number remaining for large scale multiplication; again, only very few specially good yielding strains are finally selected for recognition by the State Food Board. The result is, that the selection of families, decisive for the future course of breeding, occurs after a first performance test and on a restricted basis as regards climate. Hence in the earliest stage of the trials it is possible that families may be rejected which, in other climates than that prevailing at the breeding station, might be highly satisfactory.

The author maintains that for the solution of the problem it is essential to have the greatest possible number of small scale multiplications of all the crop plants, which are being bred, submitted to yield tests throughout the extensive German climatic provinces; only thus is it possible to be sure that all valuable gene combinations have been included. A practical way of carrying out this task is explained at length.

Other suggestions of the author's are the need for selection for quality in clover and lucerne mixtures and the evolution of a productive winter-hardy vetch, problems which he considers the amateur breeder could well solve. E. W.

1606. WELLENSIEK, S. J. • 575:633:578.08
De selectie der tropische gewassen. (The selection of the tropical crops).
Landbouwk. Tijdschr., Wageningen 1941 : 53 : 240-53.

The general procedure in breeding tropical crops is outlined. The types of crops are then classified as perennial and annual and further subdivided on the basis of (1) their self-fertilizing or cross-fertilizing capacity, whether obligate or facultative, and of (2) the possibility of vegetative reproduction. To this classification the author then applies the appropriate breeding scheme chosen from his system of five methods formulated and diagrammatically illustrated, namely: (1) plants usually vegetatively multiplied; (2) plants generally sexually reproduced, with possible vegetative reproduction; (3) perennials, only sexually reproduced; (4) annuals usually self-fertilized; and (5) annuals usually cross-pollinated.

The importance which temporary vegetative propagation would have with annual cross-fertilizers is pointed out; it illustrates the tendency, in breeding, to transfer a crop to a group with an easier scheme of selection, e.g. the treatment of facultative cross-fertilizers as self-fertilizers.

*GENETICS 575.1

1607. GARLAN, P. • 575.1
Fundamentals of genetics.
Wallerstein Laboratories Communications 1946 : 9 : No. 26 : 5-27.

The fundaments of genetical science are explained, excellent diagrams being used in illustration; some examples from yeast investigations are cited. A bibliography of 49 references is appended.

* General studies, see also individual crops.

1608. ASMOUS, V. C. 575.1(47)
Facts, feelings, and freedom of science.
 Science 1946 : 103 : 760-61.
 Replying to criticisms made by Gaposchkin, the author reiterates his reasons for believing that scientific research is not free in the Soviet Union. Reference is made again to the death of N. I Vavilov.

1609. OLSON, P. J. 575.1(47)
Scientific independence in Russia.
 Science 1946 : 103 : p. 656.
 The author associates himself with Asmous (cf. Abst. 1608 above) in expressing uneasiness as to the relation between genetical research in the Soviet Union and the official political philosophy. The mystery surrounding the death of Vavilov is alluded to once more.

1610. HADORN, E. 575.1:007
Thomas Hunt Morgan.
 Experientia, Basel 1946 : 2 : 75-76.
 A short appreciation is given of the genetical achievements of T. H. Morgan.

1611. HAYES, H. K. 575.1:007
Forrest Rhinehart Immer 1899-1946.
 Science 1946 : 103 : p. 751.
 This obituary notice of F. R. Immer recalls his many achievements in the field of plant breeding and statistical research.

1612. MULLER, H. J. 575.1:007
Thomas Hunt Morgan 1866-1945.
 Science 1946 : 103 : 550-51.
 In this appreciative obituary notice, the many contributions of T. H. Morgan to genetical science are noted.

1613. DOBZHANSKY, T. 575.1:575.22
Genetics of natural populations. XIII. Recombination and variability in populations of *Drosophila pseudoobscura*.
 Genetics 1946 : 31 : 269-90.
 A study of the variability in wild populations of *Drosophila pseudoobscura*, as shown by the behaviour of characters associated with chromosome II, demonstrated that the variation was conditioned by complexes of linked genes, which were capable of giving rise to very considerable variability by crossing-over and recombination.

1614. GYÖRFFY, B. 575.1:577.15
Gének és enzymek. (The interrelations of genes and enzymes).
 Arb. Ung. Biol. Forsch-Inst. 1943 : 15 : 450-61.
 Several examples are given in which a relation exists between the variety and the presence or absence of certain enzymes and pigments. In some cases there is only a quantitative difference in the enzyme activity but this may be sufficiently marked to serve as a criterion for distinguishing varieties. In many of the examples given the relation between enzymes and genes seems only indirect, in other cases a direct relation is more likely.
 There is no evidence that genes are enzymes but genes may have some properties in common with enzymes. Genes are most likely proteins and autocatalysts capable of reproducing themselves and initiating biological processes. E. E.

1615. FRANDSEN, K. J. 575.1:581.04
Fremstilling af Planter med forøget Kromosombesætning ved Hjælp af Colchicin. (The production of plants with increased chromosome number by means of colchicine).
 Naturhistorisk Tidende, København 1940 : 4 : 113-15.
 A concise summary is given of the investigations on the nature of colchicine and its use in plant breeding and genetics, from the time of the pioneer work of the Belgian investigator, A. P. Dustin, to the present day.

1616. GERSH, E. S. and EPHRUSSI, B. 575.116.1
The mechanism of position effect—Experiments on the phenotypic expression of position effects in relation to changes in pairing of neighboring chromosome regions.
 Proc. Nat. Acad. Sci. Wash. 1946 : 32 : 87-94.
 Experiments have been made with *Drosophila* strains carrying the gene w^m to see whether a manifestation of the position effect could be demonstrated through somatic pairing. Individuals heterozygous for w^m were obtained, which differed in the genetic construction of the chromosome homologous to that bearing w^m . The different heterozygotes were phenotypically distinct, but explanations of this difference based on theories other than that of the position effect could not be ruled out.

1617. SHAPIRO, N. I. 575.116.1:537.531(47)
On the nature of crossing-over induced by X-rays in males of *Drosophila melanogaster*.
 C.R. (Doklady) Acad. Sci. U.R.S.S. 1945 : 49 : 292-95.
 Data on the crossing-over induced by X-rays in males of *Drosophila melanogaster* are discussed with reference to the hypotheses that the action of X-rays in producing crossing-over in males is either identical with, or qualitatively different from, that responsible for chromosome aberration.

1618. DEAKIN, A. 575.17
Genetics and biological theory.
 Science 1946 : 103 : 570-71.
 Reasons are given in favour of regarding chromosomal genes as inhibitors in various ways of the general capacity of the cell to grow and develop.

1619. SIRKS, M. J. 575.17
Genenstoffen. (Gene substances).
 Vakbl. Biol. 1942 : 23 : 109-14.
 In this report of a lecture, recent research on developmental genetics and the nature of the gene and its mode of action is discussed with examples drawn from biochemical and physiological experiments on plants and animals.

1620. CASTLE, W. E. 575.17:575.127.2
Genes which divide species or produce hybrid vigor.
 Proc. Nat. Acad. Sci. Wash. 1946 : 32 : 145-49.
 The theory of Lamprecht on the origin of interspecific sterility due to the operation of interspecific genes is developed (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1161). This theory, together with Sonneborn's work on *Paramecium* (cf. *Plant Breeding Abstracts*, Vol. XIV, Abst. 780) shows that the development of a hybrid individual may depend on the consonance of certain genes with their plasmatic environment. Similar considerations may prove useful in elucidating the problem of heterotic vigour.

1621. TIMOFÉEFF-RESSOVSKY, N. W. 575.17:576.356.2
Il meccanismo di mutazione e la natura del gene. (The mechanism of mutation and the nature of the gene).
 Scientia Genetica 1942, 2 : 126-52.
 The cytogenetics of the giant chromosomes of the salivary glands of *Diptera* has confirmed the theoretical view of the structure of the genotype. A direct analysis of the constitution of the gene is still impossible because of its sub-microscopic nature, but it can be made by such indirect methods as the analysis of the immediate action of the gene and by the analysis of its variations, that is of mutations.
 There is still insufficient knowledge to lead to a general theory of the immediate action of the gene. Although we know of a series of active substances similar to hormones which are controlled by the gene, nothing is known of the intercellular action which leads to the formation of such substances.

A study of mutation* is therefore still the most direct method of research. By means of these mutations all the possible hereditary variations can be produced.

The spontaneous frequency of mutations is relatively low, about 1% per generation, and for all individual mutations and for single genes, about 0.0001%.

There are three types of mutations: the variation of a definite point in the chromosome, the rupture of a part of the chromosome and consequent rearrangement of the morphology of the chromosomes, and finally variation in the number of the chromosomes.

The increase in the frequency of mutations by means of radiation and the analysis of the effects of such radiation on the mutability of the gene offer special opportunities for elucidating the mechanics of mutations. This is shown by the experiments in *Drosophila*.

X-ray radiations increase the frequency of mutations in all the organisms studied. The influence of the radiation is direct, that is, the mutations are only produced when the chromosomes of the sex cells are irradiated. The mutations are not produced indirectly.

Further radiation can also cause the mutations to revert to the original condition.

The frequency of the induced mutations depends on the dosage of the rays applied measured in roentgen units; the time factor has no effect.

R. M. I.

1622. LINDEGREN, C. C. 575.17:632.422.3

A new gene theory and an explanation of the phenomenon of dominance to Mendelian segregation of the cytogene.

Proc. Nat. Acad. Sci. Wash. 1946 : 32 : 68-70.

It is suggested that chromosome loci, commonly referred to today as genes, should be styled "chromogenes", for it is believed that these are inactive *per se* but act as attachment loci for biologically active "cytophenes". Cytogenes may be perpetuated by multiplication at the chromogene locus to which they are attached or by reproduction in the cytoplasm. The latter possibility occurs when a substrate is present upon which the cytogene can act as a fermentive enzyme. Dominant chromogenes have a greater affinity for cytogenes than their recessive allelomorphs.

The evidence for these conceptions is based on Sonneborn's researches on *Paramecium* (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 1320) and on hybridization experiments made by the author.†

1623. PIZA, S. DE TOLEDO (JUN.) 575.182

Hereditariedade não-cromosómica e dissociação "Mendeliana" de caracteres veiculados pelo citoplasma. (Non-chromosomal inheritance and Mendelian dissociation of cytoplasmic characters).

Rev. Agric., Piracicaba 1946 : 21 : 32-39.

The author discusses the possibility of the Mendelian segregation of cytoplasmic characters.

J. G. H.

VARIATIONS, MODIFICATIONS, MUTATIONS 575.2

1624. DOBZHANSKY, T. 575.2:576.12

Studies on the genetic structure of natural populations.

Yearb. Carneg. Instn 1941-1942 (1942) : No. 41 : 228-35.

Genetic variability in natural *Drosophila* populations and its significance in evolution are discussed.

1625. EPLING, C. and 575.22

LEWIS, H.

Fertility and natural hybridization in *Delphinium* and its bearing upon gene exchange and the origin of diploid species.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 234. (Abst.).

Data on American *Delphinium* populations are used as a basis for discussing the importance of gene exchange in speciation.

* The term "mutation" is used here *in sensu lato*, i.e. including chromosomal aberrations.

† The organisms concerned, which are not specified, appear to be yeasts.

1626. HEYN, F. A. 575.243:537.5
Het opwekken van mutaties door straling. (**The induction of mutations by radiation**).
Vakbl. Biol. 1941 : 21 : 81-88, 101-05.

This survey of biophysical research on mutation is grouped under the following heads: nature of the different kinds of rays and their action on organic substances; the mutation producing action of rays as a function of dosage and other factors; discussion on theory; and brief concluding observations on practical applications.

1627. WELLENSIEK, S. J. 575.243:581.04
De invloed van colchicine op de kerndeeling. (**The influence of colchicine on nuclear division**).
Hand. Ned. Nat.- en Geneesk. Congr. 1939 : 27 : Pp. 2.

A brief account is given of the author's own findings regarding the action of colchicine on cell division (cf. *Plant Breeding Abstracts*, Vol. IX, Abst. 992).

1628. BOIVIN, A., 575.243:632.3
DELAUNAY, A.,
VENDRELY, R. and
LEHOULT, Y.
Sur certaines conditions de la transformation du type antigénique et de l'équipement enzymatique d'un colibacille, sous l'effet d'un principe inducteur de nature thymonucléique issu d'un autre colibacille (mutation "dirigée"). [**On certain conditions for the transformation of the antigenic and enzymatic properties of the colon bacillus by a thymonucleic inductor derived from another colon bacillus ("directed" mutation)**].
Experientia, Basel 1946 : 2 : 139-40.

It has been found possible to change the serological and enzymatic properties of strains of *Bacterium coli* by means of an inductor containing thymonucleic acid derived from related bacteria. This transformation however only occurs when the strains being treated are in a genetically unstable condition. The causes determining this instability are unknown.

SELECTION 575.4

1629. DUBININ, N. P. and 575.41:576.356.2
TINIakov, G. G.
Natural selection and chromosomal variability in populations of *Drosophila funebris*.
J. Hered. 1946 : 37 : 39-44.

Experiments demonstrating the effect of natural selection upon chromosomal inversions in natural populations of *Drosophila* are described.

ORIGIN OF SPECIES 576.1

1630. GOLDSCHMIDT, R. B. 576.12
Mimetic polymorphism, a controversial chapter of Darwinism.
Quart. Rev. Biol. 1945 : 20 : 147-64, 205-30.

The evolution of mimetic polymorphism in the Lepidoptera is discussed. The author reaches the conclusion that Punnett's explanation of the phenomenon as having arisen by mutation or "saltation" agrees better with the facts than Fisher's neo-Darwinian hypothesis of slow evolution and accumulation of modifiers.

1631. GOLDSCHMIDT, R. B. 576.12:575.24
"An empirical evolutionary generalization" viewed from the standpoint of phenogenetics.
Amer. Nat. 1946 : 80 : 305-17.

It is shown, in contrast to the view of G. G. Simpson and neo-Darwinists generally, that evolutionary development may occur, not through the action of selection on a large number of successive small mutants, but by the occurrence of a first mutation with a potency towards a maximum effect, the latter being realized through the operation of a subsequent mutation or mutations affecting the timing of the developmental system of the organism concerned.

1632. TRAVIN, I. S. 576.16:581.05
(The present centres of an intensive formation of species of plants).

Botaničeskiy Žurnal (J. Bot. U.R.S.S.) 1945 : 30 : 245-50.

Conditions in the tropics favour the continuity of species; and the abundant variety of plant life in these regions has been added to by plant species which have migrated from the zones outside the tropics. But although the number of genera in the tropics is large, the number of species is considered to be smaller than in the genera occurring in regions where the earth's crust has undergone, or is still undergoing, disturbance. In the author's view, new species are formed in regions of geological activity.

The chief geologically active regions of the U.S.S.R. are the Pamir, Altai and Tian-Shan mountain ranges, Transcaucasia and Kamchatka. There is close coincidence between these regions and Vavilov's centres of origin of cultivated plants. For the following reasons it is believed that the rich variety of cultivated plants at the centres is the result of geological activity and not of introduction and selection: (1) not only cultivated but wild species are more numerous in these centres than elsewhere, and (2) although mountain regions in general might be expected to constitute ancient centres of crop cultivation, it is only in those geologically active that crop plants are to be found in great variety.

1633. KLEINER, E. 576.16:582

A földrajzi fajtak elhatárolása. (On the delimitation of geographical races).

Arb. Üng. Biol. Forsch-Inst. 1941 : 13 : 447-60.

The author finds the general rules of systematics unsatisfactory in certain cases. He considers the study of birds especially suitable for the study of systematics. From an investigation of the distribution, taxonomy and morphology of birds, he shows how races may represent different degrees as regards the origin of new forms. The author is against subdividing races into smaller groups. Doubtful cases of extreme variants are decided by locality and the study of the whole rassenkreis is advocated for the determination of ecological variants.

E. E.

1634. WANSCHER, J. H. 576.16:582:001.4

Enhedsbegreber sideordnede meg og underordnede det almindelige Artsbegreb.
(Concepts of units of systematic classification, that are parallel with and subordinate to the general concept of the species).

Naturhistorisk Tidende, København 1943 : 7 : 1-4.

The prevailing usage and the proper significance of terms of classification such as *coenospecies*, *ecotype*, *rassenkreis*, *élite*, *family*, *pedigree*, etc. are discussed with observations on the systematic interrelations and correspondence between various groups of this kind.

*CYTOLOGY 576.3

1635. WELLENSIEK, S. J. 576.3

De bouwsteen der organismen. (The building stones of the organisms).

Uitgeversmaatschappij W. de Haan N.V., Utrecht 1943 : Pp. 64.

This is a chapter on the cell from a text-book on biology, entitled *Het Leven Ontsluierd (Life Discovered)*. The present chapter presents an illustrated account of the origin and development of cytological research; the cell and its functions in reproduction; and meiosis, mitosis and chromosome structure.

1636. RONDONI, P. 576.31

Cancro e denaturazione delle proteine. (Cancer and the denaturation of the proteins).

Experientia, Basel 1946 : 2 : 127-32.

This review on theories on cancer induction emphasizes the similarities between the characteristics of malignant growth and the behaviour of denatured proteins.

* General studies, see also individual crops.

1637. MINDER, W. and LIECHTI, A. 576.31:537.531
Über den gegenwärtigen Stand des Hauptproblems der Strahlenbiologie. (Modellversuche zum Primäreffekt der biologischen Strahlenwirkung). (The present position of the principal problem of irradiation biology. Researches with models on the primary effect of the biological irradiation effect).
Experientia, Basel 1945 : 1 : 298-307.
A review is given of the hit theory (Treffertheorie) and the photochemical theory of the effects of X-irradiation on biological materials. It is suggested that a comparison of the effects of X-rays on organic substances of known constitution might prove profitable.

1638. STEYAERT, R. L. 576.31:578.08
Another superior pith for free-hand sections.
Science 1946 : 103 : p. 695.
The pith of cassava (*Manihot utilissima* Pohl) is recommended for hand sectioning of botanical material.

1639. NEWCOMER, E. H. 576.311
The duality of mitochondria in plants.
Amer. J. Bot. (Suppl.) 1946 : 33 : p. 221. (Abst.).
A critical study of plant mitochondria has thrown doubt on the hypotheses of Guilliermond and Bowen that these structures are of two kinds. It is suggested instead that all the mitochondria in a plant cell are basically similar, but that their activities are various and depend on the general metabolic requirements of the cell.

1640. HINTZSCHE, E. von. 576.312:519.24
Statistische Probleme aus der Kerngrößenforschung. (Statistical problems in the investigation of nuclear size).
Experientia, Basel 1945 : 1 : 103-10.
A review is given of mathematical work on the distribution of nuclear sizes in organisms. Statistical methods suitable for such investigations are outlined.

1641. BEADLE, G. W. 576.312.2
Biochemical genetics.
Chem. Rev. 1945 : 37 : 15-96.
A wide range of genetical investigations are discussed in relation to the biochemical nature of the gene. A bibliography of 354 references is included in this valuable review.

1642. PHILLIPS, H. M. 576.312.315
The formation of nucleoli in *Erythronium*.
Amer. J. Bot. (Suppl.) 1946 : 33 : p. 222. (Abst.).
The mode of nucleolar development in *Erythronium* sp. is described. In microsporogenesis, nucleolar formation begins in telophase I and continues into prophase II. A large number of chromatic granules appear to contribute to the nucleoli, but fusion reduces the number finally to 1-6.

1643. EHRENCBERG, L. 576.312.315:633.584.3
Influence of temperature on the nucleolus and its coacervate nature.
Hereditas, Lund 1946 : 32 : 407-18.
Nucleoli tend to persist longer during mitosis in the roots of *Salix fragilis* x *S. alba* at low temperatures than at high. On the basis of this fact and others, the author discusses the coacervate theory of the nucleolus and the significance of the nucleolus in mitosis.

1644. ROSEN, G. von 576.312.32:578.65
Chromosome determination in root-tips and leaves by the rapid orcein method.
Hereditas, Lund 1946 : 32 : 551-54. (Abst.).
Details are given of an orcein method of staining chromosomes in root, leaf or bud preparations.

1645. BRACHET, J. 576.312.32:581.192:578.65
 La spécificité de la réaction de Feulgen pour la détection de l'acide thy-
 monucléique. (**The specificity of the Feulgen reaction for the detection
 of thymonucleic acid.**)
Experientia, Basel 1946 : 2 : 142-43.
 The objections urged by Stedman and Stedman (cf. *Plant Breeding Abstracts*, Vol. XIV, Abst. 692) and Carr (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 21) against the supposition that the Feulgen test is an accurate means of determining the *in situ* localization of thymonucleic acid are rebutted. Experiments performed by the author have shown that thymonucleic acid does not dissolve appreciably during acid hydrolysis.

1646. WESTERGAARD, M. 576.312.332
Aberrant Y chromosomes and sex expression in *Melandrium album*.
Hereditas, Lund 1946 : 32 : 419-43.
 This paper includes a general discussion on the genetic nature of sex-determining mechanisms and also on the probable ways in which dioecism has evolved from hermaphroditism.

1647. MORGAN, T. H. and 576.312.341
 SCHULTZ, J. 576.312.2
**Investigations on the constitution of the germinal material in relation
 to heredity.**
Yearb. Carneg. Instn 1941-1942 (1942) : No. 41 : 242-45.
 Investigations on the function of heterochromatin by means of the analysis of the variegated types of *Drosophila* are described. The chemical analysis of chromosomes by the combined use of staining technique and enzymatic digestion is also reported; experiments on the differential resistance to digestion by ribonuclease of nuclei at different mitotic phases or of nuclei differing in structure were carried out.

1648. LEVAN, A. 576.312.341:578.65
Heterochromaty in chromosomes during their contraction phase.
Hereditas, Lund 1946 : 32 : 449-68.
 By prefixing for four hours in 0.005 mol. mercuric nitrate solution and subsequent staining with crystal violet, it has been found possible to differentiate heterochromatin and euchromatin in various stages of cell division in species of *Allium* and *Dipeadi*. The heterochromatin around the centromere behaves differently from the heterochromatin in the arms.

1649. ATCHISON, E. 576.312.35:581.9:582
A preliminary phylogenetic study of the Myrtaceae.
Amer. J. Bot. (Suppl.) 1946 : 33 : p. 215. (Abst.).
 The subfamily Leptospermoideae of the Myrtaceae is characterized by a haploid chromosome number of $n = 11$. The diploid chromosome number of the Myrtoideae ranges from $2n = 14$ to $2n = c.88$. It is suggested that the Myrtoideae originated in the western hemisphere, spreading thence over the tropics and subtemperate regions generally, and giving rise to the Lepto-
 spermoideae in southern Asia.

1650. DIXON, H. H. 576.353:581.331.1:577.17
**Evidence for a mitotic hormone: observations on the mitoses of the
 embryo-sac of *Fritillaria imperialis*.**
Sci. Proc. R. Dublin Soc. 1946 : 24 : 119-24.
 Preparations of young seeds of *Fritillaria imperialis* showed an orderly sequence of successive mitotic phases distributed in the open cells of the embryo-sac lining. The author suggests that this phenomenon is due to the rate of diffusion of a hormone initiating mitosis.

1651. PROKOFIEVA-BELGOVSKAYA, A. A. 576.353:633.491(47)
**Heterocyclicity of the system "maternal chromosome—daughter
 chromosome."**
C.R. (Doklady) Acad. Sci. U.R.S.S. 1945 : 49 : 601-04.
 Observations on the sister nuclei of the binuclear cells occurring in the cortical parenchyma of ageing potato tubers and their rarely occurring mitoses are discussed. The author suggests that one of the sister nuclei is older than its partner; the two nuclei are said to form a heterocyclic

system, corresponding with each other structurally but differing in physical and chemical properties. On the basis of knowledge of chemical structure of the nuclear proteins, the two daughter chromosomes formed from the parental chromosome during mitosis are in general regarded as mother and daughter chromosomes rather than as two sister chromosomes; thus the two nuclei formed are heterocyclic. It is further suggested that heterocyclicity is the first step in the evolution of sex.

1652. STERN, H. 576.355
The formation of polynucleated pollen mother-cells in *Trillium erectum*.

J. Hered. 1946 : 37 : 47-50.

Under certain conditions, pollen mother cells of *Trillium erectum* fuse to form polynucleate cells when suspended in sucrose media; these conditions depend upon the stage of meiosis and the sucrose concentration. The various internal and environmental factors affecting cell fusion are discussed. Sucrose brings about a reduction in the structural viscosity of the protoplasm, thus enabling cell fusions to take place.

1653. WARMKE, H. E. 576.356.2
A study of spontaneous breakage of the Y chromosome in *Melandrium*.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 224. (Abst.).

A description is given of the spontaneous breaking of the Y chromosome that occurs in some strains of *Melandrium*.

1654. PADDOCK, E. F. 576.356.5:575
A theoretical advantage of using autotetraploids in crop plant breeding.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 222. (Abst.).

It is noted that, by using autotetraploid strains in hybridization and back-crossing, it is easier to eliminate undesired chromosome segments in the progenies.

1655. CORNMAN, I. 576.356.5:581.04
Alteration of mitosis by coumarin and parasorbic acid.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 217. (Abst.).

Coumarin has been found to block mitosis in plants and to give rise to various c-mitotic effects. Saturated solutions of *p*-sorbic acid apparently retard the mitotic cycle.

1656. PETERS, J. J. 576.356.5:581.04:635.25
Cytological effects of sulfanilamide on *Allium cepa*.

Bot. Gaz. 1946 : 107 : 390-92.

Sulphanilamide induces c-mitotic effects in the roots of *A. Cepa*. Its mode of action is compared with that of colchicine.

1657. GUSTAFSSON, Å. 576.356.5:581.163:581.056:575.22
The plant species in relation to polyploidy and apomixis.

Hereditas, Lund 1946 : 32 : 444-48.

The relationship between chromosome number, geographical distribution, and apomixis is considered in the light of knowledge on the inter-glacial and post-glacial history of northern Europe. It is pointed out that many lowland species have high chromosome numbers, and some alpine forms low chromosome numbers. The author suggests that the comparatively local incidence of diploid biotypes in many groups may be due to the fragmentation of an original diploid population into small splinters during the Pleistocene glaciation. Such small populations might then be expected to degenerate through inbreeding and homozygoteization, processes whose adverse effects would be nullified by polyploidy or apomixis. Thus polyploidy may not represent a superior adaptation to climatic conditions, but may instead constitute a system more genetically efficient.

1658. WITKUS, E. R. 576.356.5:635.25
Naturally occurring polyploid mitosis in the normal development of *Allium cepa*.

Amer. J. Bot. (Suppl.) 1946 : 33 : 224-25. (Abst.).

Polyploid cells are claimed to be formed during the normal development of the cotyledon of *Allium Cepa*.

SEXUALITY 577.8

577.8

1659. LÖVE, D.

Some studies on sex-determination in *Melandrium rubrum*.

Svensk Bot. Tidskr. 1940 : 34 : 234-47.

Some evidence was obtained that the Y chromosome is the larger of the two sex chromosomes of *M. rubrum* ($2n = 24$). In addition to the XY mechanism, sex appeared to be determined by other genetical and environmental factors. Natural intersexes were observed, with either male or female chromosome sets. Completely male plants appear to be able to produce intersexual flowers under certain conditions. Geographical differences in the sex ratio were also observed.

1660. LÖVE, Å. and

LÖVE, D.

Experimental sex reversal in plants.

Svensk Bot. Tidskr. 1940 : 34 : 248-52.

Preliminary experiments on the effect of the hormones, testosterone and oestrone, upon sex and secondary sexual characters in *Rumex* and *Melandrium* are reported.

EXPERIMENTAL TECHNIQUE 578

578.6

1661. ELVERS, I.

A simple method of making freehand sections.

Svensk Bot. Tidskr. 1945 : 39 : 192-96.

The essentials of the method described are as follows. A film of cellulose acetate is affixed to a slide by acetone. The cut section is transferred to the film, a few drops of acetone being applied to the section. The acetone dissolves a little of the cellulose acetate and the section becomes fixed in it. When the acetone has evaporated, the cellulose acetate again forms a hard and smooth surface in which part of the section is embedded. The rest of the section is soaked in paraffin. When the paraffin has hardened, it is removed together with the unwanted protruding part of the section, so that the desired thin section is retained. The method has been successfully applied in the preparation of various plant tissues.

1662. SERRA, J. A.

578.65:581.192

Histochemical tests for proteins and amino acids; the characterization of basic proteins.

Stain. Tech. 1946 : 21 : 5-18.

A review is given of the micro-techniques usually employed for the recognition of amino acids and proteic compounds, and modifications for increasing the efficiency of these methods are suggested. A description is included of the technique for demonstrating the presence of arginine recently introduced by the author (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 662). The application of the tests for quantitative purposes is discussed in connexion with the characterization of the basic proteins, protein concentration and zones of intense metabolism.

*BOTANY 58

1663. NOZZOLINI, V.

581.143.26.03:633.491(45)

Cenni sulla teoria degli stadi di sviluppo delle piante agrarie. Jarovizzazione della patata. (Notes on the theory of phasic development of agricultural plants. Vernalization of potatoes).

Genetica Agraria, Roma 1946 : 1 : 60-77.

The author, who has worked with T. D. Lysenko at Odessa, here reports the results of experiments carried out at the plant breeding station of S. Angelo Lodigiano (Milano) in 1945. He first explains briefly the principles of phasic development.

The thermo-stage in potatoes varies from 30 to 40 days according to the variety, during which time the tubers must be exposed to daylight (though not direct sunlight) and the temperature maintained at 8-12° C. Thus treated the tubers sprout more readily and give an earlier crop. Such treatment was applied from 20 February to 4 April in 1945 and sowing was effected on 4 April; sprouts were observed above the ground in the treated plants on 11 April, when the untreated controls had only just begun to sprout. The treated plants were more successful in surviving the drought and gave a crop by 1 June, when the controls had only just started to

* General studies, see also individual crops.

form tubers. The total yield on 25 June was 20.0 kg. in the vernalized and 8.4 kg. in the unvernalized plot, each plot comprising 50 plants, and the proportion of small tubers was much greater in the treated plants. The yield figures for treated and untreated plots lifted on 7 August were 25.0 and 19.6 kg. respectively, but this time there was little or no difference in the proportion of small tubers. Plots harvested on 26 September gave 98.7 and 88.7 kg. respectively from 200 plants treated and untreated.

Healthy potato tubers were vernalized from 1 June to 1 July 1945 and sown on 1 July; the tubers were lifted on 8 November, and the yield amounted to 82.7 kg. per 100 plants as compared with 49.3 kg. from spring sowings; the quality was also better, the tubers being larger and less damaged by insects.

The author recommends the further application of the methods of vernalization and summer planting of potatoes for the production of healthy stock in the plains without the need for importing.

1664. WENT, F. W. 581.143.26.035.1:581.036

Thermoperiodicity in plants.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 224. (Abst.).

The importance is indicated of studying temperature changes in experiments on photoperiodism. It is suggested that the night temperature may be of significance in determining the developmental morphology of plants.

1665. WOODS, M. W. and 581.174:632.8

DUBUY, H. B.

Further studies on plastid variegations.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 225. (Abst.).

The affinity of types of variegation provoked by plastid abnormalities and viruses respectively has been further demonstrated.

1666. NICKERSON, D. 581.175.11:578.08

Color measurement and its application to the grading of agricultural products.

Misc. Publ. U.S. Dep. Agric. 1946 : No. 580 : Pp. 62.

This useful publication deals with methods of colour measurement and their application to the grading of agricultural products. A bibliography of 76 references is appended.

1667. SVENSON, H. K. 582

On the descriptive method of Linnaeus.

Contr. Brooklyn Bot. Gdn 1945 : No. 103 : 273-388.

Linnaean procedure is defined and discussed with detailed reference to the works of Linnaeus.

1668. MARTIN, A. C. 582:001.4

Instability in scientific names of plants.

Amer. Midl. Nat. 1945 : 34 : 799-800.

A criticism is made of the present instability of botanical nomenclature and remedies are suggested.

***PLANT DISEASES AND PESTS 632**

1669. BLAGOVEŠČENSKIĭ, A. V. 632-1.521.6:577.1:575.41

(The biochemical factors of natural selection in plants).

Žurnal Obščei Biologii (Journal of General Biology) 1945 : No. 4 : 217-34.

This paper is mainly an up-to-date review of the relevant literature on the subject; some new experimental data obtained by the author and other workers in the Soviet Union during the war are, however, included.

The discovery that certain fungi produce substances possessing a strong bacteriostatic and bactericidal action indicates, it is suggested, that this capacity is of considerable importance in natural selection. In this connexion reference is made to penicillin, notatin, aspergillin and gramicidin. Notatin, as has been established by Raistrick's school, is identical with glucose-aerodehydrogenase, converting glucose into gluconic acid with the simultaneous formation of

*General studies, see also individual crops.

hydrogen peroxide, i.e., acting as an enzyme. Substances such as actinomycin and claviformin, on the other hand, proved to be thermostable, and their action cannot therefore be described as enzyme-like.

The adaptation of specific enzymes to the substrate is of great selective importance. The enzymatic host-parasite relationship between *Gossypium hirsutum* and *Verticillium Dahliae* is described in illustration. The fungus attacks the cotton plant by producing enzymes which decompose the protein and starch of the host; if the host produces its own potent enzymes, its resistance to the fungus is high, and conversely, plants producing less potent enzymes soon become invaded by the *Verticillium* enzymes. The presence of potent enzymes has been proved by Višnevskii to be an important factor in increasing resistance to rotting in the sugar beet. In the author's view the formation of potent proteolytic enzymes in parasitic fungi is tantamount to the production of antibodies.

The biochemical relations of insect pests and plants are also discussed.

The frost resistance of plants has been found to be linked up with their production of potent enzymes. Filatov discovered that under extremely unfavourable conditions some plants produce the so-called "biogenic stimulators," which prevent the death of the plant organism. The biogenic stimulators are regarded as an important factor in natural selection. These stimulators intensify the activity and potency of plant enzymes, and, by accelerating plant development, considerably increase the chance of survival.

1670.

WITKIN, E. M.

632.3:537.531:575.243

632.3:535.61-31:575.243

Inherited differences in sensitivity to radiation in *Escherichia coli*.

Proc. Nat. Acad. Sci. Wash. 1946 : 32 : 59-68.

Mutants resistant to ultra-violet light and X-irradiation have been obtained after subjecting strain B of *E. coli* to strong irradiation doses. Similar mutations occur spontaneously.

1671. EIGSTI, O. J.

632.3:581.04

Colchicine—a bacterial habitat.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 218. (Abst.).

A description is given of a gram-negative, motile, non-spore-forming bacterium which is able to grow in colchicine solution.

1672. BOIVIN, A.

DELAUNAY, A.

VENDRELY, R. and

LEHOULT, Y.

632.3:581.192:575.243

L'acide thymonucléique polymérisé, principe paraissant susceptible de déterminer la spécificité sérologique et l'équipement enzymatique des bactéries. Signification pour la biochimie de l'hérédité. (**Polymerized thymonucleic acid, a principle apparently able to determine the serological specificity and enzymatic equipment of bacteria. Significance for the biochemistry of heredity.**)

Experientia, Basel 1945 : 1 : 334-35.

A polymerized form of thymonucleic acid derived from the autolysis of members of one strain of *Bacterium coli* appears to be able to induce changes in the serological properties and enzyme complement of another strain of the same species.

1673. GILES, N. H. (JUN.)

632.412.1:535.61-31:575.243

Induced biochemical mutants in *Absidia glauca*.

Amer. J. Bot. (Suppl.) 1946 : 33 : 218-19. (Abst.).

Mutations have been induced in *Absidia glauca* by means of ultra-violet irradiation. Mutants were produced lacking the capacity to synthesize one or other of the following substances: pantothenic acid, *p*-aminobenzoic acid, and histidine.

1674. PLATTNER, P. A.

632.421.2:576.16:581.6

Penicillin.

Experientia, Basel 1945 : 1 : 167-79.

This review on penicillin production contains a reference to the variability that exists in penicillin productivity between different strains of *Penicillium notatum*.

1675. JOHNSON, M. J., STEFANIAK, J. J., GAILEY, F. B. and OLSON, B. H. 632.421.2:581.6
Pénicillin production by a superior strain of mold.
 Science 1946 : 103 : 504-05.

Information is given on the penicillin productivity of various strains of *Penicillium*, in particular of the high-yielding X-ray mutant X-1612 from *P. chrysogenum* 1951-B25.

1676. KEITT, G. W., LEBEN, C. C. and SHAY, J. R. 632.421.9:575.116.1
Inheritance of pathogenicity and sex reaction in *Venturia inaequalis*.
 Phytopathology 1946 : 36 : p. 403. (Abst.).

A monascosporic line of *V. inaequalis* producing typical lesions on the leaves of the Haralson and Wealthy apple varieties and flecks on the leaves of Yellow Transparent and McIntosh, was crossed with a line which stimulates the converse disease reactions in these four varieties. The eight ascospores were isolated in serial order from each of the resultant 35 hybrid ascii; the resulting lines were tested for pathogenicity to the leaves of each of the four varieties and for sex reaction. In each ascus tested, segregation for pathogenicity to each variety as indicated by the lesion or fleck reaction showed a 1:1 ratio. Of the 140 pairs of lines tested, 56 showed parental pathogenicity and 84 showed new reactions, inducing lesions on all four varieties or flecks. No evidence was obtained of linkage between the alleles conditioning pathogenicity to Haralson and Wealthy and those determining pathogenicity to Yellow Transparent and McIntosh. The latter allelomorphs were shown to be linked with those determining the sex reaction.

1677. CUTTER, V. M. (JUN.) 632.421.9:576.312.32:578.65
Observations on the chromosomal morphology of *Neurospora tetrasperma* with the acetocarmine smear technique.
 Amer. J. Bot. (Suppl.) 1946 : 33 : p. 217. (Abst.).

A suitable technique involving acetocarmine is recommended for staining the chromosomes of *Neurospora tetrasperma* Shear et Dodge.

1678. CHRISTENSEN, J. J. 632.421.9:581.04:631.521.6
Genetic variation in *Gibberella zeae* in relation to adaptation.
 Phytopathology 1946 : 36 : p. 396. (Abst.).

A monoconidial isolate of *G. Zeae* appeared to develop increased tolerance to malachite green and other substances as a result of genetic variation.

1679. RYAN, F. J. and LEDERBERG, J. 632.421.9:581.192:575.246
Reverse-mutation and adaptation in leucineless *Neurospora*.
 Proc. Nat. Acad. Sci. Wash. 1946 : 32 : 165-73.

The mutant of *Neurospora crassa* unable to synthesize leucine has been shown to undergo back-mutation to the wild type.

1680. 632.422.3:575.1
Genetics for the brewer.
 Wallerstein Laboratories Communications, 1946 : 9 : No. 26 : 1-3.

Attention is drawn to the importance of recent genetical investigations on yeast for future developments of the brewing industry.

1681. VOGT. 632.422.3:575.148
 Staatliches Weinbauinstitut in Freiburg i. Br. Versuchs- und Forschungsanstalt für Weinbau und Weinbehandlung. Jahresbericht 1939. (**Government Institute for Viticulture at Freiburg, Baden. Experimental and Research Institute for Viticulture and Wine-making. Annual Report 1939.**).
 1940 : Pp. 51.

VOGT.

Staatliches Weinbauinstitut in Freiburg i. Br. Versuchs- und Forschungsanstalt für Weinbau und Weinbehandlung. Jahresbericht 1940. (**Government Institute for Viticulture at Freiburg, Baden. Experimental and Research Institute for Viticulture and Wine-making. Annual Report 1940.**).

1941 : Pp. 40.

Of seventy pure yeasts grown since 1938, thirty were kept for further study, and as a result, in 1940, one race was added to the Institute's collection of pure yeasts; in addition to the usual necessary qualities, it has properties very desirable for the making of dry wines.

E. W.

1682. NYBERG, C. 632.422.3:576.356.5:581.4
 Ueber sogenannte S- und R- Formen bei den Hefen. (**The so-called S and R forms of yeasts.**).
 Zbl. Bakt. 1941 : 103 : 277-80.
 [From Bull. Inst. Pasteur 1943 : 41 : p. 368].

From a culture of bottom yeast grown on an agar medium and containing ascospores, two kinds of colonies were obtained. One type, S, was large, round and bright in appearance; the other type, R, was smaller, dullish and round, but with irregular margins. The author suggests that the S and R forms represent the diploid and haploid generations, respectively, of the yeast under investigation.

1683. NYBERG, C. 632.422.3:576.356.5:581.4:575.242
 Ueber sogenannte S- und R- Formen bei den Hefen. II. (**The so-called S and R forms of yeasts. II.**).
 Zbl. Bakt. 1942 : 105 : 241-48.
 [From Bull. Inst. Pasteur 1943 : 41 : p. 369].

Colonies of forms R and S were produced by a pure culture of yeast R in which conjugation had taken place (cf. Abst. 1682 above). The S type appeared to be a homozygous diploid form. At 26-27° the S form sporulated and produced a small proportion of S₁ mutants, which gave rise to S colonies smaller in size than the original S type. At the same temperature the R yeast conjugated, and in addition to the usual S form, several colonies of the type S₁ were produced. The cells of the S colonies were larger than those of the R colonies. The cells of the S₁ mutants did not differ from those of the S type.

1684. GATTANI, M. L. 632.451.2:575.243:575.12
Differences in diploid lines of *Ustilago zeae*.

Phytopathology 1946 : 36 : p. 398. (Abst.).

Several diploid lines were obtained in the progeny of a cross between a relatively stable haploid line 10A₄ and a mutable haploid line 17D₄. Seven diploid lines differed *inter se* and from the parents in the following characters: (1) appearance on the nutrient media; (2) rate of growth and enzyme production; (3) adaptability to arsenic and malachite green; (4) ability to cause anthocyanin production on selfed lines of maize; and (5) pathogenicity on maize. One of the diploid lines 410qq, intermediate between the parents in most cultural and physiological characters, was mutable like the parent line 17D₄. Numerous mutants were obtained by growing 410qq on media containing lithium, arsenic or uranium. Some of the mutants were haploid. When these were paired with 10A₄, however, normal infection occurred, indicating that the dissociation of the diploid line 410qq resulted in the production of haploid lines similar in many respects to the original parent, line 17D₄.

1685. MASTENBROEK, C. 632.452:576.16:633.22
Gele roest (*Puccinia glumarum*) op kropaaer (*Dactylis glomerata*). [Yellow
rust (*P. glumarum*) on cocksfoot (*D. glomerata*)].
Tijdschr. PlZiekt. 1946 : 52 : 66-67.

A yellow rust observed on cocksfoot might, it is thought, be identical with race 36 of Straib.
If not, it is a new physiological form.

1686. FRANDSEN, N. O. 632.482:576.16:633.1
Septoria-Arten des Getreides und anderer Gräser in Dänemark. (*Septoria*
species of cereals and other grasses in Denmark).
Medd. Plantepat. Afd., Kgl. Veterinærog Landbohøjskole, København 1943 :
No. 26 : Pp. 92.

Numerous species of *Septoria* are critically discussed in detail and with copious references to various authorities. Some new species are described and one new genus *Lunospora*.
The problem of specialization for different hosts is referred to, the difficulty of choosing suitable diagnostic criteria being specially mentioned.

The susceptibility of host plants to various fungi is recorded in the course of the discussion.

1687. HANSEN, H. P. 632.8:001.4
Om Nomenklatur for Plantevira samt nogle Synonymer for Kartoffelvira og Kartoffelviroser. (On nomenclature for plant viruses and some synonyms for viruses and virus diseases of the potato).
Tidsskr. Planteavl 1941 : 46 : 363-72.

Systems for naming plant viruses are discussed and a list of synonyms for the European viruses is given as well as a list of common synonyms in several European languages for virus diseases of potatoes.

1688. EICKE, R. and 632.8-1.521.6:581.192:633.491
KÖHLER, E. Beobachtungen an den Eiweisskristallen der Kartoffelsorte "Juli". (Observations on the protein crystals of the potato variety Juli).
Protoplasma 1943 : 38 : 64-70.

This paper gives the results of an attempt to show that the protein crystals of the potato variety Juli are connected with the virus A with which this variety is invariably affected. E. W.

1689. HANSEN, H. P. 632.8-1.521.6:633.491(48.9)
Studier over Kartoffelviroser i Danmark II. Fortsatte Sortsundersøgelser.
(Studies on potato viruses in Denmark II. Variety investigations continued).
Tidsskr. Planteavl 1941 : 46 : 355-62.

Fifteen varieties of potatoes of which eleven are wart immune were analysed for virus content in healthy looking plants. Some virus free clones were obtained from certain varieties.
The 15 varieties were also tested for their reaction to different viruses.

ECONOMIC PLANTS 633

1690. GYÖRFFY, B. 633:576.3:581.04
A colchicin hatásmechanizmusa. (A review on the mechanism of colchicine action).
Arb. Ung. Biol. Forsch.-Inst. 1940 : 12 : 330-51.

A review is given of investigations on the action of colchicine in animal and plant tissues, and its effect on nuclear division and chromosome numbers. There is a possible correlation between lowered plasma viscosity as induced by colchicine and changes in nuclear division. E. E.

1691. GYÖRFFY, B. 633:576.356.5:581.04
Chromosomaszámlálások colchicinnel előállított polyploidoknál. (Chromosome numbers in colchicine induced polyploids).
Arb. Ung. Biol. Forsch.-Inst. 1940 : 12 : 326-29.

Using colchicine, polyploid forms were obtained of the following species: *Antirrhinum majus*, *Capsicum annuum*, *Epilobium alpinum*, *E. collinum*, *Hyoscyamus albus*, *H. niger*, *H. albus* x

H. niger, *H. pusillus*, *Impatiens balsamina*, *Linum usitatissimum*, *Lycopersicon esculentum*, *Petunia nyctaginiflora* and *Stellaria media*. Progeny of several of these forms were raised.

E. E.

1692. GYÖRFFY, B. 633:576.356.5:581.1

A polyploid növények élettana. (**The physiological and chemical conditions in polyploid plants**).

Arb. Ung. Biol. Forsch.-Inst. 1941 : 13 : 362-446.

The literature dealing with morphological and physiological differences between diploids and polyploids is reviewed.

This review is supplemented by the author's own work, which includes the following investigations: analysis of chlorophyll pigments; the determination of the osmotic pressure of young and old plants under different and strictly controlled climatic conditions; comparison of assimilation rates; and investigations on vitamin C content, time of flowering and ripening of seeds, seed weight and number, rate of germination, and surface area of the cotyledons. There are only a few clear cut results. Vitamin C is increased in the tetraploids in comparison with the diploids, but not doubled as claimed by some investigators. A decrease in number of seeds was also observed.

Much of the experimental data is explained on the grounds that polyploids are more variable and thus have a higher adaptability under unfavourable conditions. It is suggested that this hypothesis is also supported by the geographical distribution of polyploids. The author concludes that doubling of chromosomes does not double the effects of genes as the equilibrium of optimum genetic conditions found in diploids is upset in polyploids. This may also account for the absence or lethal nature of the polyploid condition in many species. E. E.

1693. 633-1.524(47)

An agricultural expedition to Iran.

Agriculture, Moscow 1945 : No. 6 : 10-11. (Mimeographed).

A recent expedition to study the agriculture of Iran is briefly reported. Plant breeding material is mentioned.

1694. 633-1.524(47)

Plant industry. 3. Botanists return from expeditions.

Agriculture, Moscow 1945 : No. 11 : 3-4. (Mimeographed).

Brief mention is made of recent expeditions of the Komarov Botanical Institute to the mountainous districts of Ferghana and the pastures and forests of the Caucasian Mountains. From the expedition to Ferghana, new nut and apple trees have been obtained.

1695. ANDERSSON, G. 633-2.111-1.521.6

Kölden och växtlivet. (**Cold and plant life**).

Sverig. Utsädesfören. Tidskr. 1946 : 56 : 69-74.

This broadcast lecture dealt with causes of hardening and cold resistance in crop plants from the standpoints of the physiologist and the Swedish breeder and farmer.

1696. STEPANOV, V. N. 633-2.111-1.521.6(47)

(Resistance of agricultural crops to frost during various developmental phases).

Moskovskaja ordena Lenina Seljskohozjaistvennaja Akademija imeni K. A. Timirjazeva. Doklady Vypusk III. Naučnaja Konferencija 4-11 Čjunja 1945 g. (Timirjazev Agric. Acad. Moscow Proc. No. III. Sci. Conf. 4-11 June 1945) 1946 : 28-32.

This short paper contains a comprehensive table giving data on the frost resistance of 49 cultivated crops during germination, flowering and maturity or ripening. The table summarizes the results of extensive geographical experiments carried out by the former Institute of Agricultural Meteorology, as well as the material provided annually during the period 1931-42 by 60 agricultural meteorological stations in the U.S.S.R.

Field husbandry.

Agriculture, Moscow 1945 : No. 10 : 7-9. (Mimeographed).

Grain varieties developed at the Shortandinsk Selection and Experiment Station in the Akmolinsk region of the steppes are briefly described. The new varieties include the hard spring wheat, Hordeiforme Akmolinka 05; the soft spring wheats, Milturum Akmolinka 1, Caesium Boets, and Erythrospermum Akmolinka 6; the frost resistant rye varieties, No. 1 and Zima; and the pea variety, Shortandinsky 047.

The new pea variety, Urozhainy, cultivated at the Siberian Research Institute at Omsk, yields four quintals per hectare more than any other variety, and is pest and disease resistant. In Siberia and the non-black earth regions this variety ripens uniformly, harvesting thus being facilitated.

1698. PISSAREV, V. E. and

VINOGRADOVA, N. M.

633.1:575.127.5:633.289(47)

Trigeneric hybrids *Elymus* x wheat x rye.

C.R. (Doklady) Acad. Sci. U.S.S.R. 1945 : 49 : 218-19.

Crossing between rye-wheat amphidiploids and *Elymus arenarius* is reported. Such crossing has so far proved to be more successful than the direct hybridization of wheat with *Elymus*. Two plants of one of the trigeneric hybrids are described in detail. These plants showed the summer type of habit as a dominant character, although the rye and wheat involved were winter forms. The plants were also annuals, with ears of the wheat type, in contrast to the perennial habit and mixed ear type of the wheat x *Elymus* hybrids previously reported (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 947). The chromosome number was the expected one of $2n = 56$.

1699. GRAIFF, G. L.

633.1:581.143.26.03

Contributo allo studio della "Primaverilizzazione" dei cereali nei paesi caldoridi con speciale riguardo al grano. (A contribution to the study of the "vernalization" of cereals in countries with a hot, dry climate, with special reference to the grain).

Ann. Cent. Sper. Agrar. Zootec. Libia 1941 (1942) : 4 : 9-34.

After a short summary of the subject of vernalization in general, experiments are described which show that appropriate treatment of the grain causes considerable acceleration in development.

R. M. I.

1700. FORLANI, R.

633.1:581.46

Sulle spighe ramificate o "del miracolo". (Branched or "miracle" ears).
Genetica Agraria, Roma 1946 : 1 : 78-94.

Plants with branched ears have been observed in the progenies of various crosses between wheats having normal ears. Several such plants were found in the F_2 of a cross Damiano Chiesa x Damiano Chiesa; their progeny were nearly all normal, though certain individuals showed slight signs of ramification.

Other plants with branched ears have appeared in the crosses Mentana x (Mentana x Cappelli) and (Mentana x *Triticum dicoccum*) x Cappelli, as well as in various crosses in which one of the parents was of the branched eared type. Other crosses of *T. vulgare* x branched *T. turgidum* had normal ears.

Branched ears were found in the F_4 of a barley cross, Leonessa x Naked 5, and the character was transmitted to the progeny of some of the branched ears. Culms bearing double ears were observed in the progeny of the same cross and also in *Lolium temulentum*.

1701.

WALLIN, J. R.

633.1-2.3:576.16:631.521.6

633.2-2.3:576.16:631.521.6

Parasitism of *Xanthomonas translucens*. (J. J. and R.) Dowson on grasses and cereals.

Iowa St. Coll. J. Sci. 1946 : 20 : 171-93.

Physiological races of *Xanthomonas translucens cerealis*, races 1-6, have been identified on the basis of the differential reaction of oat varieties, *Bromus inermis* varieties and *Bromus* spp.

In addition, the races parasitize wheat, barley, rye and *Agropyron repens*. It is suggested that the name, *Xanthomonas streak*, should be used for all the diseases of cereals and grasses caused by *X. translucens cerealis*.

WHEAT 633.11

1702. GRAIFF, G. L. 633.11(61.2)
 Contributo alla cerealicoltura libica. (A contribution to the cultivation of cereals in Libya).
Ann. Cent. Sper. Agrar. Zootec. Libia 1940 (1941) : 3 : 123-55.
 The problems of cereal cultivation in Libya are discussed and the performance of the following ten varieties of wheat, examined from an ecological point of view with regard to their adaptability to Libyan conditions, is described: Mentana, Quaderna, Riale, Etruria, Marchetti 114, Anna Migliori, Bruno Braschi, Autarchia, Georgico and Orzo Martin. R. M. I.

1703. AUSEMUS, E. R., 633.11:575(77.6)
 STAKMAN, E. C.,
 HANSON, E. W.,
 GEDDES, W. F. and
 MERRITT, P. P.
Newthatch wheat.
Tech. Bull. Minn. Agric. Exp. Sta. 1944 : No. 166 : Pp. 20.
 The new hard red spring wheat, Newthatch, was produced by crossing Hope with Thatcher and back-crossing twice to Thatcher. Under field conditions it shows resistance to both leaf and stem rusts. In milling and baking qualities Newthatch is superior to Thatcher, Renown and other varieties in protein content and loaf volume, and equal to these varieties in yield of flour and crumb characters.

1704. 633.11:575.127.5:633.289(47)
Agricultural Research Institutions.
 Agriculture, Moscow 1945 : No. 10 : 14-15. (Mimeographed).
 The work at the Cicin Institute on crossing wheat or wheat-rye hybrids with *Agropyron* and *Elymus* with wheat, rye and barley, is briefly described.

1705. SÉGUÉLA, J. M. 633.11:575.42(61.1)
 Technique de la sélection du blé en Tunisie. (The technique of wheat selection in Tunisia).
Ann. Serv. Bot. Agron. Tunis. 1941 : 18 : 71-143.
 Details are given of the technique of wheat selection as practised in Tunisia. Selection is made over a five-year period on a mixture of forms, followed by multiplication in the next two years. Improvements may also be gained by the introduction of foreign varieties. The technique of hybridization is described in detail up to the fourth generation in the multiplication of pedigree seed. R. M. I.

1706. CHIN, T. C. and 633.11:576.354.4:575.127.2:576.16
 CHWANG, C. S.
Cytogenetic studies of hybrids with "Makha" wheat.
Bull. Torrey Bot. Cl. 1944 : 71 : 356-66.
 The results of crossing *Triticum Macha* with the hexaploid wheats, *T. vulgare* and *T. Spelta*, and with the tetraploid species, *T. durum*, *T. turgidum* and *T. dicoccoides*, indicate that *T. Macha* differs cytologically and genetically from the other hexaploid wheats.

1707. DIONIGI, A. 633.11:581.142:575.182
 Eredità del carattere "letargo delle cariossidi" in incroci reciproci di frumento. Meccanismo di letargo dei semi. (Inheritance of the character "delayed germination of the caryopsis" in reciprocal crosses of wheat. Mechanism of delayed germination of the seed).
Genetica Agraria, Roma 1946 : 1 : 32-37.
 After mentioning the various ways in which delayed germination in wheat may be determined by environmental factors, the author proceeds to describe experiments demonstrating genetic

control of this characteristic. When the variety Virgilio S.5, a variety with delayed germination, is crossed as female parent with M.33, a variety which germinates promptly, the F₁ offspring exhibit delayed germination. In the reciprocal cross, however, the F₁ grains germinate promptly. Similar results were obtained by crossing M.33 with T.D. S.2, another variety with delayed germination. By crossing Virgilio S.5, as female parent, with M.33 and Mentana, both promptly germinating varieties, it was shown that the male parent also influences the rate of germination, more rapid germination being observed in the first cross than in the second. It is concluded that delayed germination is determined principally by the female parent via the endosperm; a minor influence, however, must be attributed to the male parent.

1708. CÂMARA, A. 633.11:581.143.4
Transplantação de embriões. (Transplantation of embryos).
 Agron. Lusitana 1943 : 5 : 375-86.

A number of transplanting experiments with cereals are described. Embryos of wheat grew better on endosperms of rye than of barley, and embryos of *Triticum vulgare* grew better on *Secale* than on *T. durum* or *T. turgidum*. Again, the hexaploid wheats did better than the tetraploids on *Aegilops ovata*; thus the degree of affinity in grafting corresponds broadly to the compatibility in hybridization.

The plants resulting from transplantation showed modifications in respect of time of maturity and characters of the grain.

1709. SHARMAN, B. C. 633.11:581.46:575.127.2
Agropyron-like segregates from a cross between *Triticum vulgare* Host. and *T. durum* Desf.
 J. Hered. 1946 : 37 : p. 55.

It is reported that segregates with heads resembling those of *Agropyron* have been obtained in the F₂ of a cross between *Triticum vulgare* Host. and *T. durum* Desf.

1710. SWEN, C. I. 633.11:581.6:581.142
(Variation and inheritance of protein content, gluten quality, and delayed germination in some wheat crosses).
 Kwangsi Agric. 1942 : 3 : 1-37.

A comprehensive study was made of the mode of inheritance of protein content, gluten quality, and delayed germination in some wheat crosses. Evidence has shown that proper breeding methods can be used to increase protein content, improve gluten quality, and combine other desirable characters with these two.

L. P. B.

1711. WAAL, D. DE 633.11:582:578.088(49.2)
Het onderscheiden van de nederlandsche tarwerassen aan het zaad door de kleurreactie met phenol. (Distinguishing the Dutch varieties of wheat by the colour reaction of the seed with phenol).
 Landbouwk. Tijdschr., Wageningen 1940 : 52 : 753-60.

As a result of tests of Dutch, spring and autumn wheats, a detailed classification has been drawn up on the basis of the reaction of the seed to phenol.

The age of the seed affects the reaction but need not invalidate the method for identification of varieties.

1712. SCHIEMANN, E. 633.11:582:9
 633.16:582:9
Die Getreidefunde der neolithischen Siedlung Trebus, Kr. Lebus/Mark. (The discoveries of cereals of the Neolithic settlement, Trebus, Kr. Lebus Mark).
 Ber. dtsch. bot. Ges. 1940 : 58 : 446-59.

Results of the examination of various species of *Hordeum*, *Triticum dicoccum*, *Agrostemma Githago* and *T. monococcum* collected from a neolithic site at Trebus are reported, and the determinations compared with those of Wittmack and Werth. After a study of aberrant forms of the grain in *T. monococcum* and emmer, the specimen grains of *T. monococcum* were classified by the author as belonging to emmer.

E. W.

1713. RODRIGUEZ V., J. 633.11-2.452-1.521.6(72)
Observations on leaf and stripe rust of wheat in Mexico.
Phytopathology 1946 : 36 : p. 410. (Abst.).
A number of improved United States wheats have proved to be highly susceptible to races of leaf rust (*Puccinia rubigo-vera*) in field tests in Mexico. Pilot, Rival, Regent, Renown and Newthatch showed susceptibility. Mida was resistant. Several Kenya selections were moderately susceptible; the three *T. durum* wheats, Mindum, Kubanka and Arnautka were heavily infected. Most of the local varieties exhibited rust susceptibility.
Many local wheats were attacked by stripe rust (*Puccinia glumarum*); certain Kenya lines and many lines of Renacimiento x (41-116) were also susceptible. Trigo Supreme x (41-116) lines exhibited resistance.

1714. STRAIB, W. and 633.11-2.452-1.521.6:581.036.1
NOLL, A. Untersuchungen über den Einfluss der Hitze auf den Rostparasitismus.
(Investigations on the effect of heat on rust parasitism).
Zbl. Bakt. 1944 : 106 : 257-77.
Previous research by the authors showed that the resistance of many wheat varieties to yellow rust (*Puccinia glumarum*) increases with rise of temperature. This property is more evident, the more advanced the growth of the plant host; hence susceptibility is often observed in the cotyledon stage and yet a high resistance is found later in the open. Some wheat varieties show "summer resistance" to many races of yellow rust.
Heat treatment was effected by immersion of the leaves in water at the chosen temperature. The behaviour of the wheat plant towards *P. glumarum* and *P. triticina* and the course of infection was studied.
Wheats which had been heat treated for the same periods of time showed, some days after infection, an increase followed by a decrease in the external resistance characters (chlorosis and necrosis), with a rise of temperature up to 35°. Immersion for ten minutes at 40° or for five seconds at 50° when effected five days after inoculation completely represses fructification of *P. glumarum* and *P. triticina*.
If heat treatment takes place before the inoculation with yellow or brown rust, then susceptibility to attack is increased, this effect being particularly evident in the case of highly resistant varieties. The lowering of resistance due to the action of heat shows gradations specific for race and variety. The original resistance of the host plant returns some time after heating.
High temperatures, after infection of the host with *P. glumarum* and *P. triticina*, cause deposition of a resinous substance on the mycelia. Heating of the wheat leaves before infection leads to a temporary inhibition of the formation of this resin and promotes mycelial growth. Another concomitant phenomenon of resistance is silicification of the infected tissues. E. W.

1715. DRAGHETTI, A. 633.11-2.452-1.521.6:581.4(45)
Natura genetico-morfologica-ambientale della resistenza del frumento alle puccinie sp. **(The genetical, morphological and environmental nature of resistance of wheat to *Puccinia* sp.).**
Genetica Agraria, Roma 1946 : 1 : 103-11.
It is argued that resistance to fungi cannot be treated as a genetical character as such but must be ascribed to some morphological or physiological character which, in combination with a particular set of environmental conditions, leads to resistance. Rust resistance in wheat, for instance, was found to be greater in hot, dry zones than in hot, humid zones, and awned lax eared varieties proved more resistant than dense or awnless varieties. This is ascribed to the influence of these characters on the water balance of the plant. A further character regarded as contributing towards rust resistance is absence of pigment in the epidermis of the straw and leaves; such forms permit the entry of the solar rays into the tissue and this is thought to inhibit the development of the parasite. Two good local varieties, Rieti and Cologna, were crossed with an oriental *albidum* variety and from the progeny two forms with absolutely white straw, one awned and the other awnless, were selected. Both proved much superior to red pigmented varieties such as Mentana and Villa Glori in both yield and resistance to rusts, especially *Puccinia glumarum*. Both varieties, named respectively Mutina Precoce Aristato and Mutina Precoce Mutico, are becoming increasingly popular in cultivation.

1716. CALDWELL, R. M.,
CARTWRIGHT, W. B. and
COMPTON, L. E. 633.11-2.7-1.521.6:575.11
Inheritance of hessian fly resistance derived from W38 and durum P.I. 94587.
J. Amer. Soc. Agron. 1946 : 38 : 398-409.

The inheritance of Hessian fly resistance was investigated in crosses involving the *T. durum* wheat, P.I. 94587, and the *T. vulgare* wheats, W38 and B36162A13-12, as resistant parents; B36162A13-12 is derived from the cross F₁ (Fultz-Hungarian x W38) x Wabash. The following soft red winter wheats were used as susceptible parents: Wabash, Dawson, Gladden, and four selections from the cross Fultz x Hungarian C.I. 4830, designated F.H. 126, F.H. 27, C.I. 11850 and C.I. 12017.

The resistance of W38 and B36162A13-12 was found to depend upon an incompletely dominant gene pair, designated *H*₃*H*₃. The limited data suggest that the resistant *T. durum* wheat, P.I. 94587, differs from the susceptible wheats, Gladden and C.I. 11850, by at least two dominant genes for resistance.

1717. AUFHAMMER, G. 633.11:664.641.016(43)
Erfolge der Kleberweizenerzeugung. Die Ergebnisse der Qualitätsuntersuchungen von 1935-1942. (**Successes in the production of high gluten wheats. Results of quality tests from 1935 to 1942.**)

Forschungsdienst 1944 : 17 : 397-407.

Baking tests have shown that good baking properties are controlled by the characteristics of the variety, and in particular by the quality and quantity of the gluten.

The testing of a high gluten wheat should not take place at once after the harvest, as progressive later ripening raises the values found, e.g. in one case, testing directly after harvesting gave a quality index of 4063; seven months later it was 4898. In comparing grain from different regions for gluten it must be noted that the amount of gluten depends largely on the nitrogen content of the soil. The most widely cultivated varieties of wheats were grown at the Weihenstephan Institute to test their gluten quality. The results for 53 winter wheats and 24 summer wheats are tabulated.

Amongst commercial varieties today, ten summer wheats are named and stated to be almost always classed as high gluten wheats.

The importance of certain varieties in the cultivation of high gluten wheats is shown by the percentage of submitted samples, approved by the Weihenstephan Institute; thus, for winter wheats, 95% of Tassilo samples were accepted, 75% of Ackermanns Jubel, and 87% of a new wheat Firlbeck. Amongst the summer wheats which were outstanding were Janetzkis Früh (Early Janetzkis), Wahlberger and Lichitis Weihenstephan. Heines Koga, a new summer wheat, showed an excellent grain yield with less gluten, but gluten of such strength that the expansion index was high.

Tests have shown that varieties with the best baking properties have in general, as good yields as high-yielding wheats with inferior baking properties.

One aim of future breeding should be the transformation of high-yielding winter wheats into types having a quality index of 4050-3000; another aim should be the attainment of the maximum amount of protein per unit of area cultivated. High yield and high gluten content can be combined in breeding, but high yield, exceptional gluten quality and high gluten content cannot be combined in breeding, if the yield is to be maintained.

E. W.

1718. ÅKERMAN, Å., 633.11:664.641.016(48.5)
LINDBERG, J. E. and
JAKOBSSON, J. 633.14:664.641.016(48.5)
Undersökningar av kvaliteten hos 1944 års brödsädesskörd. (**Investigations on the quality of the 1944 cereal harvest.**)

Sverig. Utsädesfören. Tidskr. 1945 : 55 : 343-75.

A detailed account is given of the results of analyses of the quality of 494 samples of autumn wheats, 249 of spring wheats and 302 of rye from various parts of Sweden.

1719. MANUNTA, C. 633.11:664.641.016:575.061.6
Sul colore delle farine. Studio comparato del contenuto in pigmenti delle farine di varie razze di Triticum coltivate in varie località. (Flour colour. A comparative study of the pigment content of the flours from different Triticum races cultivated in different localities).

Genetica Agraria, Roma 1946 : 1 : 38-59.

A method of determining the various pigments is described which consists of determining first the total carotenoids then breaking this up into (a) carotenes and xanthophyll esters and (b) free xanthophylls; and then determining the non-carotenoid pigments.

An examination of eight wheat varieties grown in a number of different localities in Italy showed that the total carotenoid content is a constant varietal character very little influenced by environmental differences. The ratio of carotene to xanthophyll differed in the different varieties and there are indications that the proportions of the different carotenes also differed. A fairly reliable varietal diagnosis is therefore possible based on the study of the flour pigments alone. The distribution of the pigments within the grain also varied from variety to variety.

BUCKWHEAT 633.12

1720. MEYER, K. 633.12:581.48
Normale und anomale Buchweizensamen. (Normal and anomalous buckwheat seeds).

Angew. Bot. 1943 : 25 : 354-58.

Notes and illustrations are given on buckwheat seeds differing in shape from the typical forms of the two species *Fagopyrum esculentum* Moench and *F. tataricum* Gaertn.

OATS 633.13

1721. FRÖIER, K. 633.13:537.531:575.11.061.633
Genetical studies on the chlorophyll apparatus in oats and wheat.

Hereditas, Lund 1946 : 32 : 297-406.

The distribution of the triplicated *chlorina* and *lutescens* factors has been investigated in Swedish hexaploid oat varieties. The mutation from *Chlor* to *chlor* has advanced further in the Probsteier varieties than in the black-hulled central Swedish forms. In the case of the mutation from *L* to *l*, the converse relation was observed.

Three new spontaneous chlorophyll mutations are reported: *albovirescens* in hexaploid oats, a *tigrina* type in *Avena strigosa*, and *luteomaculata* in hexaploid oats.

Experiments with X-irradiation showed that a fair number of recessive chlorophyll mutants could be produced both for diploid wheats and diploid oats. In the case of hexaploid varieties, the oats gave rise to several chlorophyll mutants, especially the variety Stormogul I, but no such mutants could be obtained for wheat, even at a dosage of 20,000 r.

It is supposed that gene reduplication accounts for the relatively scarce occurrence of chlorophyll mutants in hexaploid forms. A discussion is included on the genetic system controlling chlorophyll development.

1722. JUDKINS, W. P. 633.13:577.17
The influence of kernel size, age, location in panicle, and variety of oat, on the variability of the Avena test.

Amer. J. Bot. (Suppl.) 1946 : 33 : 181-84.

It is noted that early maturing oat varieties are less sensitive for the *Avena* hormone test than late varieties such as Victory.

1723. WEXELSEN, H. 633.13-1.8-1.521.6
Kombinerte foredlings- og kvelstoffgjødslingsforsøk i havre. (Combined breeding and nitrogen manuring experiments with oats).

Tidsskr. Norske Landbr. 1943 : 50 : 25-36.

These Norwegian trials were conducted in the course of breeding operations during 1933-40 at Vidarshov to ascertain how the various lines tolerated and utilized nitrogen manures. The 28 forms tested included Perle (Pearl), Hein, Gullregn II (Golden Rain II), Hvit Odal (White Odal), Kyø, Primus and 22 lines from Cross No. 20, Grenader (Grenadier) x Akklamatisering 4

(Acclimatization 4), Cross No. 21-1, Grenader x Klokke II, Cross No. 24-1, Grenader x Thor, Cross No. 24-2 and Odin x Perle. The detailed results are of interest though the main aim of the experiment to discover lines able to stand and benefit from heavy nitrogen manuring was not achieved.

1724. HANSING, E. D.,
HEYNE, E. G. and
STANTON, T. R. 633.13-2.451.2:576.16:631.521.6(78.1)

A new race of *Ustilago avenae*.

Phytopathology 1946 : 36 : p. 400. (Abst.).

A new race of *U. Avenae* has been identified in Kansas. Data are given of the susceptibility of oat varieties and hybrid selections.

1725. HANSING, E. D.,
HEYNE, E. G. and
STANTON, T. R. 633.13-2.451.2:576.16:631.521.6(78.1)

Reactions of oat varieties and selections to four races of loose smut.

Phytopathology 1946 : 36 : 433-45.

Data are given on the reaction of oat varieties and promising hybrids to four races of *Ustilago Avenae* collected in Kansas, and designated races A, B, C and D. Races A and D are distinct from the races reported by other investigators.

A high degree of resistance to all four races was shown by Black Mesdag, Large Hull-less, Red Rustproof, Navarro, Markton, Brunker, Bond, New Nortex, Neosho, Bonda, Mindo, and several hybrid selections. The variety Neosho, distributed in Kansas in 1945, appears to be promising as a parent for future breeding. In addition to its outstanding loose smut resistance, it is resistant to the common races of crown and stem rust, and shows desirable agronomic characters.

1726. SIANG YIN KO,
TORRIE, J. H. and
DICKSON, J. G. 633.13-2.452-1.521.6:575.11
633.13:581.48:575.11
633.13:575.11 "793".

Inheritance of reaction to crown rust and stem rust and other characters in crosses between Bond, *Avena byzantina*, and varieties of *A. sativa*.

Phytopathology 1946 : 36 : 226-35.

Crosses between several varieties of *Avena sativa* and the variety Bond (*A. byzantina*) were analysed for the mode of inheritance of reaction to *Puccinia coronata Avenae* and *P. graminis Avenae*, various kernel characters, and earliness.

With the exception of the cross Bond x S.D.334, the segregation found for reaction to crown rust can be explained by either the hypothesis of Hayes *et al* (cf. *Plant Breeding Abstracts*, Vol. XI, Abst. 689) that Bond carries two complementary factors, or by the hypothesis of Torrie (cf. *Plant Breeding Abstracts*, Vol. X, Abst. 750) which suggested that a factor *S* for resistance and an inhibiting factor *I* determine reaction to crown rust.

Resistance to stem rust was found to depend upon a single factor pair.

The following kernel characters were investigated in the crosses, Bond x Hawkeye and Bond x S.D.334: number and length of basal hairs, type of basal articulation, rachilla attachment, lemma colour, awnedness and twisted base of awn. In the cross Bond x Hawkeye these characters were found to be monogenic and linked. In the cross Bond x S.D.334, the characters were found to be digenic and linked. The inheritance of earliness of heading was examined in the same two crosses. In Bond x Hawkeye earliness showed partial dominance over late heading, and the segregation observed suggested that at least three factor pairs are involved, and that Hawkeye, the late parent, possesses genes for earliness of heading. In Bond x S.D.334, lateness of heading was dominant over early heading, and appeared to depend upon at least one main factor and possibly one or more modifying genes.

1727. MURPHY, H. C. and
MEEHAN, F. 633.13-2.484-1.521.6:575.116.1(77.7)

Reaction of oat varieties to a new species of *Helminthosporium*.

Phytopathology 1946 : 36 : p. 407. (Abst.).

Oat varieties with the Victoria type of crown rust resistance were highly susceptible in the field and greenhouse to a new species of *Helminthosporium*, while varieties lacking this type of crown rust resistance were resistant.

The data from eight hybrids, each involving one parent with the Victoria type of crown rust resistance, suggest complete linkage between the genes conditioning the Victoria type of crown rust and susceptibility to the new species of *Helminthosporium*.

RYE 633.14

1728. ÅKERBERG, E. and WIKLUND, K. 633.14:575(48.5)
Erfarenheter från förädlning och försök med höstråg vid Sveriges Utsädesförenings Västernorrlandsfilial under 10-årsperioden 1935–1944. (Results obtained from breeding and trials with winter rye at the Västernorrland Branch Station of the Swedish Seed Association during the ten year period 1935–1944).

Sverig. Utsädesfören. Tidskr. 1945 : 55 : 431–43.

Early results of rye trials at the station have already been recorded (cf. *Plant Breeding Abstracts*, Vol. XI, Abst. 125).

If rye cultivation is to be extended in Norrland the breeder must provide a higher yielding and reliable type that is also more hardy and more resistant to the parasites incidental to overwintering in Norrland, and is shorter and stiffer strawed, later in ripening (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 980, and Vol. XVI, Abst. 734) and easily cultivated.

In trials in upper and inner Norrland, Toivo, Norbottens lantråg (Norbotten land rye), Björn (Bear) and Oiva have shown the highest grain yields; Björn had also the highest hectolitre weight. The Finnish variety Å 34/67 (from Finnish Wasa x Förädlad Wasa II) proved very winter-hardy.

Results since 1940 have shown that Björn should replace Förädlad Wasa II in most districts of Norrland.

Å 34/54 is higher yielding, more winter-hardy, stiffer strawed and earlier ripening than Björn and is soon to be put on the market as a new variety or a new élite of Björn.

The importance of raising pedigree seed of a variety within the climatic environment in which the variety is to be grown is discussed. The role of rye as a crop for different parts of Sweden is also considered.

1729. ÖSTERGREN, G. and PRAKKEN, R. 633.14:576.35
Behaviour on the spindle of the actively mobile chromosome ends of rye.

Hereditas, Lund 1946 : 32 : 473–94.

Evidence is brought forward to support the conclusion that the actively mobile chromosome ends of certain rye strains are furnished with spindle fibres. It is believed that both they and the centromeres are positively attracted to the spindle poles at metaphase and thereafter.

1730. MÜNTZING, A. 633.14:581.162.5
Sterility in rye populations.
Hereditas, Lund 1946 : 32 : 521–49.

A survey has been made of the incidence of male and female sterility in the two varieties Stålåg and Östgöta Gråråg. Although environmental factors play a significant role in determining sterility, it is probable that genetical factors are also important.

MAIZE 633.15

1731. HAYES, H. K., RINKE, E. H. and TSIANG, Y. S. 633.15:575.12
Experimental study of convergent improvement and backcrossing in corn.

Tech. Bull. Minn. Agric. Exp. Sta. 1946 : No. 172 : Pp. 40.

Improvements in the general and specific combining ability of inbred lines of maize in single and double crosses have been obtained by back-crossing and convergent improvement. A method of "gamete selection" (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 986) is discussed,

by means of which it is possible to select inbred lines or other material to be used as a basis for improving specific combining ability in double hybrids. In the authors' view, back-crossing in conjunction with gamete selection is the most desirable method of improving inbred lines for use in specific double crosses.

1732. SHULL, G. H. 633.15:575.12

Hybrid seed corn.

Science 1946 : 103 : 547-50.

A review is presented of the development of hybrid maize production in the U.S.A., which dates from the author's own pioneer research on this subject.

1733. GRANER, E. A. 633.15:575.12:575.116.1(8)

Testes para a localização de fatores genéticos no milho. Testes de ligação.
(**Tests for the localization of genetical factors in maize. Linkage tests.**)

Rev. Agric., Piracicaba 1946 : 21 : 8-20.

The author transferred certain well-known and well-located genes with good phenotypic expression from North American maize varieties into lines that grow well in South America. Segregation studies indicated that in more than 90% of cases the phenotypic effect was not altered. Linkage tests were effected to discover the position of the genes in their new backgrounds.

J. G. H.

1734. CRIM, R. F., et al. 633.15:575.12:631.547.6(77.6)

Maturity ratings of corn hybrids registered for sale in Minnesota in 1944.

Bull. Minn. Agric. Exp. Sta. 1945 : No. 383 : Pp. 19.

Maturity ratings in days, based upon the moisture content at the time of husking, are given for commercial maize hybrids in Minnesota.

1735. GILLY, C. L. and 633.15:575.22(72)
MELHUS, I. E.

Distribution and variability in teosinte.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 235. (Abst.).

Fresh information is given on the natural variation exhibited by Guatemalan, Mexican and "Florida" teosintes.

1736. ANDERSON, E. 633.15:576.16:582(72)

Maize in Mexico—a preliminary survey.

Ann. Mo. Bot. Gdn 1946 : 33 : 147-247.

An account is given of the very considerable variability of the maize cultivated in Mexico, as observed in a recent survey of the crop. The usual classification of sweet corn, dent, flint, etc. was found to be valueless in studying Mexican maize. Population analysis is considered to be the most effective means of investigating variability in a cross-pollinated crop such as maize. Row number and kernel width were found to be the most important characters, and values for these were plotted against each other on Cartesian co-ordinates. The next most important characters, kernel denting and the degree to which the kernel is pointed, were also recorded on the diagrams. Other characters studied included shank diameter, husk striation, kernel thickness, compression of the cob base, and enlarged cob base. By this method three races were separated: (1) the Mexican Pyramidal race of central Mexico, (2) the Mexican Narrow Ear race of western Mexico, and (3) the Mountain Yellow race, found in regions of high altitude. The available evidence suggests that the fundamental reasons for the existence of these races are largely historical, but that their persistence in modern times is partly due to their adaptation to the different areas.

Several varieties grown for special purposes are described: varieties with coloured aleurone used as green maize; a large kernelled flour type known as Cacahuazintle and apparently derived from the Guatemalan variety, Salpor; maíz dulce, whose significance in the history of American sweet corn is briefly indicated; the ancient pop corn of the western coast of Mexico, maíz reventador, and the rice pop corns of the same region.

The classification of the maize of Mexico, the origin of denting, and the genetics of characters conditioned by multiple factors in North American maize, are discussed in the light of the results of the survey. An appendix contains numerous photographs of cobs, and diagrams in illustration of the common varieties cultivated in Mexico.

1737. DODDS, K. S. and
SIMMONDS, N. W. 633.15:576.356

A cytological basis of sterility in *Tripsacum laxum*.

Ann. Bot. 1946 : 10 : 109-16.

A description is given of meiosis in the pollen mother cells of *T. laxum* Nash. The chromosome number appears to be $2n = 72$. Various irregularities occur resulting usually in male sterility. Bridges were observed in anaphase II but not in anaphase I; it is suggested that these arise through the fusion of the homologous ends of sister chromatids.

1738. PORTER, J. W.,
STRONG, F. M.,
BRINK, R. A. and
Neal, N. P. 633.15:577.16(77.5)

Carotene content of the corn plant.

J. Agric. Res. 1946 : 72 : 169-87.

Significant differences in carotene content due to genetical constitution have been observed, but are considered to be unimportant in comparison with the differences associated with seasonal conditions and the stage of plant development. The sun-red character was found to have no effect upon carotene content.

1739. MELHUS, I. E.,
SEMENIUK, G.,
WALLIN, J. R.,
WATKINS, G. M. and
GOODMAN, G. J. 633.15:581.14

Comparative development of some United States, Mexican and Central American corns at different latitudes and altitudes.

Amer. J. Bot. (Suppl.) 1946 : 33 : 220-21. (Abst.).

Comparative data are presented on the developmental morphology of maize forms from the U.S.A., Mexico and Guatemala. The experiments were replicated in nine different localities.

1740. SASS, J. E. 633.15:581.141
Development of endosperm and antipodal tissue in "Argentine waxy" maize.

Amer. J. Bot. 1946 : 33 : p. 223. (Abst.).

Details are given of the development of the endosperm in Argentine Waxy maize.

1741. PHINNEY, B. O. 633.15:581.45:575.11
Cell length in the parenchyma of the midrib of normal and dwarf-1 maize at various stages of development.

Amer. J. Bot. (Suppl.) 1946 : 33 : 222-23. (Abst.).

A description is given of the comparative developmental histology of the leaves of maize carrying the dwarf 1 gene and the normal allelelomorph respectively.

1742. WANG, F. H. 633.15:581.481:575.125
Embryological development of inbred and reciprocal hybrid *Zea mays* L.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 224. (Abst.).

Embryos of hybrids between inbred maize lines were found to exceed the parental controls in size as soon as eight days after pollination.

1743. MALIANI, C. 633.15:582(45)
 Studio comparativo sui granturchi coltivati nelle Venezie nel 1942—Comunicazione preliminare. (**Comparative studies of the maize varieties cultivated in the Venice provinces in 1942. Preliminary communication.**).

Genetica Agraria, Rome 1946 : 1 : 95–102.

Tabular data are given regarding height of plant, height of main cob, litre weight, thousand grain weight and time of maturity for 94 maize varieties collected in the Venice region. Observations were also made on a number of other morphological and agronomic characters.

1744. BORLAUG, N. E. 633.15–2.452–1.521.6(72)

Diseases of teosinte in Mexico.

Phytopathology 1946 : 36 : p. 395. (Abst.).

Lines and varieties of maize from various parts of North and South America exhibited considerable differences in reaction to *Puccinia Sorghi*.

1745. ULLSTRUP, A. J. and 633.15–2.484–1.521.6:575.116.1
 BRUNSON, A. M.

Linkage relationships of a gene determining susceptibility to a disease in corn.

Phytopathology 1946 : 36 : p. 412. (Abst.).

Susceptibility in maize to *Helminthosporium carbonum* race 1 is inherited as simple recessive. The gene pair conditioning reaction to the infection has been designated *Hm hm*. Linkage group investigations indicate that the factor pair *Hm hm* is probably situated on chromosome one and approximately 20 cross-over units to the left of the pair *Br br*.

1746. HEYNE, E. G., 633.15.00.14(78.1)
 CLAPP, A. L.,
 PORTER, C. R.,
 SCOTT, W. O. and
 DAVIS, C. D.

Kansas corn tests, 1945.

Bull. Kans. Agric. Exp. Sta. 1946 : No. 329 : Pp. 40.

The bulletin presents a report of maize hybrid and variety tests conducted in Kansas during 1945, and also a summary of the results of tests held during the past six years.

1747. WIIDAKAS, W. and 633.15.00.14:575.12(78.4)
 JENSEN, L. A.

1945 hybrid corn field trials.

Agron. Mimeo. Circ. N. Dak. Agric. Exp. Sta. 1946 : No. 77 : Pp. 20. (Mimeo-graphed).

The results of the 1945 tests of maize hybrids and varieties in North Dakota are reported. Data are given on several characters.

BARLEY 633.16

1748. BACHTEYEV, F. KH. 633.16:575.12:575.148
(Data on the intravarietal crossing of barley).

Izvestija Akademii Nauk S.S.R. Serija biologiceskaja. (Bull. Acad. Sci. U.R.S.S., Sér. Biol.) 1945 : No. 4 : 471–84.

Experiments were carried out between 1936 and 1940 with nine barley varieties. No significant difference between the progenies of crossed and uncrossed seed was obtained in respect of time of maturity, mildew attack or lodging; the number of productive tillers was 12–37% greater in the F_1 generation from crossed seed in several of the varieties, but the difference disappeared in the F_2 and F_3 generations; in seven varieties there was no difference even in the F_1 and in three varieties the crossed plants were inferior. In height, six of the varieties showed increases from 0·4 to 9·6% in the F_1 , one variety was the same and two showed a decrease; in the F_2 eight varieties still showed an increase, whilst Pioneer showed a decrease. The variety Wiener was crossed both in 1936 and 1937 and the former seed gave an increase in plant height whilst the latter gave a reduction. Slight differences in favour of the crossed seed were evident also in the F_3 .

In length of ear an increase was observed in eleven cases out of 29; in ten cases there was a reduction and in the remaining eight no difference. In the variety Zolatoi (Golden) the difference persisted into the F_3 , whereas in all other varieties, the F_3 showed no difference or was shorter than the control.

Number of grains per ear showed an increase in eight out of the nine varieties in the F_1 but only three varieties maintained an increase in the F_2 , the rest being equal to the controls, or, in three varieties, inferior. In the F_3 only one variety showed an increase.

The 1000 grain weight was greater in several varieties in the F_1 and in some varieties also in F_2 and F_3 , whilst again some varieties gave values below those for uncrossed seed in these generations.

As regards yield, the F_1 of five varieties showed increases varying between 3.9 and 36.3%; the yields of the other three varieties were -1.2, -15.7 and -52.9% less than those from uncrossed seed. In the F_2 half the varieties showed yield increases of 5.4 to 14.7% and the others decreases varying from 7.5 to 36.0%. Increases of from 1.7 to 14% were obtained in F_3 in half the varieties and decreases of 0.7 to 17.2% in the rest. Examining the varieties individually, it was seen that the varieties Wiener (from seed crossed in 1936), Colchicum 10/30 and Nutans 7805 gave increases in F_1 , F_2 and F_3 (the first also in F_4); the varieties Nutans 11886 and Červonec gave increases only in F_1 and F_2 and the variety Darwin only in F_1 . The variety Pioneer showed a decrease in all three years and Velvet in two successive years. Wiener crossed in 1937 showed decreases in all three years. The crossing was carried out on this variety in both years with pollen from a number of plants collected at random and the only difference was that in 1936 the crossing was performed in the greenhouse in spring, and in 1937 in the field in summer.

In discussing the results, the author expresses the view that "selective fertilization" alone is insufficient to ensure the best results from intravarietal crossing and suggests that the most effective method would be to pollinate with a pollen mixture collected not from plants at random but from a group of the best developed plants of the most healthy and vigorous appearance. At the present stage, in view of the varied results obtained in the present experiments, it is not thought desirable to apply intravarietal crossing widely in agricultural practice.

1749. PISSAREV, V. E.,
VINOGRADOVA, N. M. and
PODDUBNAYA-ARNOLDI, B. A. 633.16:575.127.5:633.289:576.356.52(47)
A haploid barley plant produced by remote hybridization.
C.R. (Doklady) Acad. Sci. U.R.S.S. 1945 : 49 : p. 372.

A description is given of a sterile *Hordeum* haploid plant ($2n = 7$), obtained from the cross *H. vulgare distichum* var. *transcaspicum* x *Elymus arenarius*. Its production is attributed to the parthenogenetic development of the egg-cell which was stimulated by the pollen of *E. arenarius*.

1750. PARKER, J. H. 633.16:581.6(73)
More and better barley.

Wallerstein Laboratories Communications 1946 : 9 : No. 26 : p. 59. (Abst.).

The Mid-west Barley Improvement Association, organized in 1945, has as its objective the use of improved barleys for malting and brewing. Varietal tests are to be conducted.

1751. DOJES, R. P. 633.16-1.421
Een modern rassenproefveld. (A modern experimental field for testing varieties).

Meded. Nat. Comité voor Brouwgerst, Wageningen 1936 : No. 1 : Pp. 20.

After a preliminary discussion of the advantages over the usual method of extensive field tests, offered by the modern agricultural experimental fields, the author briefly summarizes, by way of illustration, the results of comparative trials with five varieties of brewing barley in such an experimental field divided into three sections, each of which was subdivided into plots with increasing potash and phosphate content in the soil, and increasing degree of soil acidity. A detailed analysis of the yields of the different plots (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 1266) indicated a notable favourable effect of potash on the quantity and quality of yield, and a depressing effect of the increasing degree of pH; phosphate affected the yield but slightly. It is pointed out that the varieties tested differed considerably in their sensitivity to differentiation in field conditions.

In conclusion, attention is called to the fact that, while undoubtedly time and money saving, such studies will require to be properly systematized, and call for the wide co-operation of all the parties interested in the question.

V. A.

1752. DICKSON, J. G. 633.16-2.484-1.521.6(77.5)
***Helminthosporium* foot rot of barley.**

Phytopathology 1946 : 36 : p. 397. (Abst.).

Experiments under different conditions of temperature and soil moisture in the greenhouse have demonstrated the relative susceptibility to *Helminthosporium sativum* of Wisconsin Barbless in contrast to that of Oderbrucker.

MILLETS AND SORGHUM 633.17

1753. PARODI, L. R. 633.17:582
 Las especies de *Sorghum* cultivadas en la Argentina. (**The species of *Sorghum* cultivated in Argentina**).

Rev. Argent. Agron. 1946 : 13 : 1-35.

The author gives a taxonomic survey of the sorghum species cultivated in the Argentine including descriptions of several new varieties. Keys for identification of the species and detailed drawings of the spikelets for each species are also included.

J. G. H.

1754. SEIGLINGER, J. B. 633.174:575(76.6)
Progress in sorghum improvement.

Bull. Okla. Agric. Exp. Sta. 1946 : No. B-295 : 61-64.

An account is given of sorghum improvement at the Oklahoma Agricultural Experiment Station.

Grain sorghum breeding includes as its objectives the development of (1) varieties suitable for combine harvesting, (2) a non-bitter darsø, and (3) waxy sorghums. Several selections of Dwarf kafir are ready for increase and more extensive trials. The problem of finding resistance to weather discoloration enters into the breeding of non-bitter darsø.

In the improvement of forage sorghum, the production of types with different maturities, increased seed palatability and standing ability, and better retention of the leaves is receiving attention. African millet, Sumac, Collier and Leoti have been crossed with white and yellow seeded sorghums.

An attempt is being made to breed improved syrup varieties.

Objectives in broomcorn improvement include a brush free from weather staining, the elimination or diminution of the hardness of the glumes and fibres, and heads free from centre stems. Types which do not stain red have been secured from a cross between broomcorn and Leoti; these types stain brown, which is, however, a less undesirable colour. One selection of the same cross appears to be genetically free from centre stems. Crossing broomcorn and broom kaoliang produced segregates with smoother glumes, but these selections require to be back-crossed to broomcorn for a satisfactory brush.

Investigations on resistance to the chinch bug and charcoal rot or lodging disease are in progress. Indication has been obtained that resistance to charcoal rot has a genetic basis.

1755. KARPER, R. E. and 633.174:576.16:575.11(73)
 QUINBY, J. R.
The history and evolution of milo in the United States.

J. Amer. Soc. Agron. 1946 : 38 : 441-53.

The genetic constitution of the milo group of *Sorghum vulgare* Pers. is described, and a historical account is presented of the different varieties grown in the United States. Root rot resistant varieties, the production of new varieties through intervarietal hybridization, the genetic stability of milo, and the agricultural value of the various recessive mutations are also discussed.

1756. STEPHENS, J. C. 633.174:581.48:575.113.4.061.6(73)
A second factor for subcoat in sorghum seed.

J. Amer. Soc. Agron. 1946 : 38 : 340-42.

The development of a brown seed integument in sorghum depends upon the factor pair *Bb* and a complementary factor pair designated by the author *B2b2*. From data obtained by the

author and other investigators, it is suggested that with the exception of Shal lu most of the sorghum varieties in the United States are homozygous dominants for the factor *B2*, and that presence or absence of the brown layer reported in the segregations was due to the constitution of the first factor pair.

1757. OLIVE, L. S.,
 LEFEBVRE, C. L. and
 SHERWIN, H. S. 633.174-2.483-1.521.6(75.2)
 633.282-2.483-1.521.6(75.2)

The fungus that causes sooty stripe of sorghum spp.

Phytopathology 1946 : 36 : 190-200.

Data are given on the relative susceptibility of Sudan grass, Johnson grass and several sorghum varieties to the fungus causing sooty stripe, *Ramulispora Sorghi* (Ell. and Ev.) Olive and Lefebvre.

RICE 633.18

1758. VIÉGAS, G. P.,
 GERMEK, E. B. and
 MIRANDA, H. S. 633.18:575(81)
Contribuição para a melhoria da rizicultura no estado de São Paulo. (Con-
tribution towards the improvement of rice cultivation in the state of
São Paulo).

Bragantia, São Paulo 1945 : 5 : 187-96.

A careful system of seed production of the best varieties has been instituted and has resulted in an improvement in quality, and an almost complete eradication of red grains. Actual breeding work was started in 1936 at Pindamonhangaba and Pindorama for irrigated and upland conditions respectively. The best variety so far for irrigated land is Fortuna, introduced from the U.S.A. via Colombia; 372 varieties in all have been introduced and some are still undergoing testing.

By selection in the variety Iguape two different types have been produced, Iguape-agulha and Iguape-catéto; the former has now replaced the variety Iguape and the latter the variety Catéto. The first crosses were made in 1938 and some of the hybrids show signs of being superior to Iguape in the irrigated zone.

Brief descriptions are given of the varieties referred to above and some others of the more popular varieties in cultivation.

For non-irrigated zones the variety Pérola, produced by the Genetics Section, is now recommended, since it has excelled the common variety Jaguari by 25-30% in yield and is singularly free from shedding.

1759. KUANG, H. H.,
 TU, D. S. and
 CHANG, Y. H. 633.18:575.12(51)
Tung Pu Loa, a natural hybrid of rice.

Acta Brevia Sinensis 1945 : No. 9 : p. 16. (Abst.). (Mimeographed).

This paper has been previously summarized (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 1018).

1760. CHOW, J. K. and
 LI, W. C. 633.18:575.12:578.08
(A study of the methods of artificial hybridization of rice).
Kwangsi Agric. 1940 : 1 : 3-8.

The hot water method of emasculation as used by Jodon has proved useful in Kwangsi, China.
 L. P. B.

1761. KUANG, H. H.,
 FENG, T. M. and
 TU, D. S. 633.18:575.12:581.02(51)
Studies on the percentage of seed setting in varietal crosses in rice.

Acta Brevia Sinensis, 1945 : No. 9 : p. 17. (Abst.). (Mimeographed).

Investigations on seed setting in varietal crosses under different environmental conditions were carried out.

1762. KUANG, H. H.,
CHANG, Y. H. and
TU, D. S. 633.18:581.48:575.114.3:582(51)
Studies on the variation of polyhusks in cultivated rice.

Acta Brevia Sinensis 1945 : No. 9 : p. 15. (Abst.). (Mimeographed).

The inheritance of the polyhusk character has been previously reported (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 1019). Further work has dealt with the variation of the character and its secondary effect upon the spikelets. The percentage of the polyhusked spikelets per spike varies widely both annually and with the type of rice. The most significant differences exist between the *indica* and *japonica* types; the bearing of this fact on the evolution of these two types is discussed.

The presence of extra husks exerts a considerable influence upon the fertility of the normal spikelet in the same spike. Other abnormalities, such as multiple seeds, twin grains, polyflorets, and extra veins on the lemma and palea, are regarded as secondary effects of the genes for the polyhusk character.

The character of polyhusks is treated as a case of atavism, and the taxonomy of the genus *Oryza* is discussed from this viewpoint.

1763. HSU, T. S. 633.18-1.421
(An experiment on intervarietal competition in rice).

Kwangsi Agric. 1940 : 1 : 14-20.

For yield trials of rice it is not advisable to use the single-row plot. A plot should comprise three rows, the central one of which only is to be harvested. L. P. B.

1764. CHILTON, ST J. P. and
TULLIS, E. C. 633.18-2.484:576.16:631.521.6(73)
A new race of *Cercospora oryzae* on rice.

Phytopathology 1946 : 36 : p. 395. (Abst.).

The rice variety Rexoro, hitherto resistant to the known races of *Cercospora Oryzae* in Louisiana and Texas, has shown susceptibility to a new race of the fungus. The differential varieties, Blue Rose, Blue Rose 41, Caloro and Fortuna, are resistant to the new race. The recently released varieties, Texas Patna and Bluebonnet, which each have Rexoro as one parent, both exhibit susceptibility. Segregation data from the F₂ hybrids between resistant varieties and Rexoro indicate that susceptibility is a simple Mendelian recessive character.

FORAGE GRASSES 633.2

1765. SCHMIEDER, M. v. and
NIGGL, L. 633.2/3:575(43)
Im Dienste der Futterpflanzenzüchtung. (**In the service of fodder plant breeding.**)

Forschungsdienst 1944 : 17 : 617-18.

A brief review is given of the progress made in Germany in improving forage grasses and clover.

1766. 633.2/3:575(73)
Improving pastures and grasslands for the Northeastern States at the U.S. Regional Pasture Research Laboratory.

Misc. Publ. U.S. Dep. Agric. 1946 : No. 590 : Pp. 29.

This bulletin includes an account of (1) general objectives in breeding improved varieties of grasses and legumes, (2) the various stages in breeding procedure, (3) the improved varieties under test at the co-operating experiment stations, (4) fundamental genetical investigations, and (5) work on disease resistance in forage crops.

1767. 633.2/3:581.143.26.035.1(73)
Eighth Annual Report of the U.S. Regional Pasture Research Laboratory State College, Pa 1944 : Pp. 115. (Mimeographed).

This is a progress report concerned with the forage crop problems of the north-eastern United States. Breeding, genetical and cytological work is in progress with *Poa pratensis*, *Dactylis glomerata*, *Lolium perenne*, *Festuca elatior*, *Sorghum vulgare* var. *sudanense*, *Medicago sativa*, *Trifolium repens* and other species.

1768.

633.2/3:581.143.26.035.1(73)

Ninth Annual Report of the U.S. Regional Pasture Research Laboratory State College, Pa 1945 : Pp. 116. (Mimeographed).

The ninth annual progress report of the U.S. Regional Pasture Research Laboratory, at Pennsylvania State College follows along the lines of previous reports. The laboratory concerns itself with the forage problems of the north-eastern states; cytogenetical and breeding work on *Dactylis*, *Trifolium repens*, *Bromus inermis*, *Poa pratensis*, *Festuca elatior* and other species is reported. Summaries of the investigations conducted by the state stations in co-operation with the laboratory, and the progress reports of the various state stations are also presented.

1769. STAHL, C.

633.2-1.521.5(48.9)

Beretning fra Statsfrøkontrollen for det 70. Arbejdsaar fra 1. Juli 1940 til 30. Juni 1941. (Report from the State Seed Control Station for the 70th Year of Work from 1 July 1940 to 30 June 1941).

Tidsskr. Planteavl 1942 : 46 : 569-641.

This report contains information on seed production and authenticity, based on seed samples of various cereals and other crops.

The effects of temperature on germination of *Poa palustris*, *P. pratensis* and *Festuca rubra* are discussed.

A comparison was made between laboratory and field germination of sweet lupin. Special attention is paid to the role of technique in such experiments.

1770. STUCKEY, I. H. and

BANFIELD, W. G.

633.23:576.312.35:575.127.2

The morphological variations and the occurrence of aneuploids in some species of *Agrostis* in Rhode Island.

Amer. J. Bot. 1946 : 33 : 185-90.

An investigation into the natural variation exhibited by Rhode Island *Agrostis* populations has brought to light a complicated pattern of variation involving *A. tenuis* Sibth. and *A. alba* L. and many intermediates. The wide range of morphological variation was paralleled by a wide range of cytological variation ($2n = 28$ to $2n = 42$), but the two sets of characters were not correlated.

1771. GUSTAFSSON, Å.

633.23:582

The relationship of *Calamagrostis neglecta* and *lapponica* in Siberia, as interpreted by Nilsson-Ehle.

Hereditas, Lund 1946 : 32 : 550-51. (Abst.).

The author recalls some evidence collected by Nilsson-Ehle in 1898-99 on the intergrading of *C. lapponica* and *C. neglecta* in the Lena district of Siberia.

1772.

633.251:581.143.26.03(47)

Plant industry. 2. Winter wheat planted in the spring.

Agriculture, Moscow 1945 : No. 11 : 2-3. (Mimeographed).

Winter wheat planted in spring, which therefore did not pass through the vernalization stage and continued to grow thickly throughout the summer, has been used experimentally as a green fodder crop. The crop was mowed three times during the months of July to September, and yielded 40-46 tons of fodder per hectare. Powerful roots, reaching a depth of one metre or more, were developed. The winter wheat planted in the spring ripened ten days earlier than the autumn planted control and yielded a grain crop of 4.5 tons per hectare.

1773. KREITLOW, K. W. and

MYERS, W. M.

633.264-2.452-1.521.6

Reactions to crown rust in *Festuca elatior* and *F. elatior* var. *arundinacea*.

Phytopathology 1946 : 36 : p. 404. (Abst.).

Greenhouse experiments confirmed field observations that *Festuca elatior* is generally susceptible to *Puccinia coronata*, while *F. elatior* var. *arundinacea* is usually resistant. The chromosome number of *F. elatior* was found to be $2n = 14$, that of *F. elatior* var. *arundinacea* $2n = 42$; hybrids between the two forms were completely sterile.

1774. ROGLER, G. A. 633.285:575(78.4)
Two new grasses—Mandan wildrye and green stipagrass.
 Bi-m. Bull. N. Dak. Agric. Exp. Sta. 1946 : 8 : No. 5 : 11-12.
 633.289:575(78.4)

The new grasses, Mandan wild rye (*Elymus canadensis*) and green stipa grass (*Stipa viridula*) are being released.

Mandan wild rye was developed by mass selection within two plant progenies of Canadian wild rye. The variety is superior to the ordinary *E. canadensis* in several characters. Its chief advantages are the ease with which it becomes established, its rapid growth, and high seed and forage production. Observations indicate that Mandan wild rye possesses a wide adaptability. The variety is also more rust resistant than the other strains tested.

Green stipa grass was developed from a single plant selection of *S. viridula*. It shows superiority to the original type in general vigour and size, and produces high yields of seed and forage. The variety can probably be grown in most of the Northern Great Plains region, giving a good performance on most kinds of soil. It makes rapid growth after defoliation and is particularly useful for pasture seedings.

1775. LOVE, R. M. 633.285:575.127.2
Interspecific hybridization in *Stipa* L. I. Natural hybrids.

Amer. Nat. 1946 : 80 : 189-92.

A short account is given of interspecific hybridization involving *S. cernua* Stebbins et Love, *S. lepida* Hitchc. and *S. pulchra* Hitchc.

1776. STEBBINS, G. L. (JUN.), VALENCIA, J. I. and VALENCIA, R. M. 633.289:576.356:575.127.5
Artificial and natural hybrids in the Gramineae, tribe Hordeae I.
Elymus, Sitanion and Agropyron.

Amer. J. Bot. 1946 : 33 : 338-51.

An account is given of the following natural and artificial intergeneric hybrids of the Hordeae: *Agropyron Parishii* Schribn. et Smith x *Sitanion jubatum* J. G. Sm., *A. pauciflorum* (Schwein.) Hitchc. x *Elymus glaucus* Buckl., *A. pauciflorum* x *S. jubatum*, *E. glaucus* x *S. jubatum*, *Agropyron* sp. "San Benito" x *A. pauciflorum*, *Agropyron* sp. "San Benito" x *E. glaucus* var. *Jepsoni* Davy, *Agropyron* sp. "San Benito" x *Sitanion hystrix* (Nutt.) J. G. Sm. and *A. pauciflorum* x *E. glaucus* var. *Jepsoni*. The hybrid *E. glaucus* x *S. jubatum* is equivalent to *S. Hansenii* (Schribn.) J. G. Sm., while *A. pauciflorum* x *S. jubatum* is similar to *A. Saundersii* (Vasey) Hitchc.

In all the species and hybrids examined, 28 chromosomes were present. Descriptions are given of meiosis in the forms studied. The relationship between chromosomal behaviour and fertility was elucidated.

It is clear that the taxonomy of the Hordeae needs drastic revision in order to bring it into line with cytological data.

LEGUMINOUS FORAGE PLANTS 633.3

1777. CARLSON, J. W. 633.31-1.531.12
Pollination, lygus infestation, genotype, and size of plants as affecting seed setting and seed production in alfalfa.

J. Amer. Soc. Agron. 1946 : 38 : 502-14.

Seed production in lucerne has been investigated in relation to genotype, method of pollination, plant size, and lygus bug infestation.

1778. TYSDAL, H. M. 633.31-1.531.12
Influence of tripping, soil moisture, plant spacing, and lodging on alfalfa seed production.

J. Amer. Soc. Agron. 1946 : 38 : 515-35.

Investigations are reported on the effects of insects and other factors upon flower tripping* in lucerne, and the effects of soil moisture, plant spacing and lodging on seed production.

* The disengagement of the androecium and gynoecium from the keel of the flower.

1779. VANSELL, G. H. and
TODD, F. E. 633.31-1.531.12:581.162.3
Alfalfa tripping by insects.
J. Amer. Soc. Agron. 1946 : 38 : 470-88.
Extensive studies on the insect pollination of lucerne are described.

1780. 633.32:575(47)
Husbandry. 3. Valuable properties of wild clover.
Agriculture, Moscow 1945 : No. 9 : 6-7. (Mimeographed).
An account is given of experiments on the wild clover at the Oirotian Animal Husbandry Experimental Station. The wild clover yields a good hay crop, is frost and disease resistant, and forms seeds in rainy unfavourable weather. Experiments on wild hybrid clover are to be carried out.

1781. RICKER, P. L. 633.364:582
New and noteworthy Asiatic species of *Lespedeza*.
Amer. J. Bot. 1946 : 33 : 256-58.
Descriptions are given of the following new species and varieties of *Lespedeza*: *L. mucronata*, *L. albiflora*, *L. japonica* var. *ovata*, *L. Metcalfi* and *L. paradoxa*.

1782. WEIMER, J. L. and
ELROD, J. M. 633.364-2.421.1-1.521.6(75.8)
Powdery mildew of annual lespedezas.
Plant Dis. Reporter 1946 : 30 : 13-16. (Mimeographed).
Considerable variation in resistance to powdery mildew (*Microsphaera diffusa* Cke and Peck) was noted among different lots and varieties of *Lespedeza striata* and *L. stipulacea* tested in Georgia.

1783. GESCHER, N. VON. 633.367:575
The sweet lupin, a new plant-breeding conquest.
Int. Rev. Agric. 1943 : 34 : 327T-46T.
An account is presented of investigations on the sweet lupin in Germany and other countries, and of the various uses of the crops. Selection work is discussed with reference to the following characters: absence of alkaloids, increased fertility, rapid growth in the first stages of development, earliness of ripening, resistance to shattering, white seeds, susceptibility to the action of lime, tenderness of the seed integument, small seed size, and glabrous pods.

1784. RITCHIEY, G. E.,
MCKEE, R.,
BECKER, R. B.,
NEAL, W. M. and
DIX ARNOLD, P. D. 633.372(75.9)
Crotalaria for forage.
Bull. Fla Agric. Exp. Sta. 1941 : No. 361 : Pp. 72.
The value of the following *Crotalaria* species for hay and silage has been investigated: *C. anagyroides* H. B. K., *C. Grantiana* Harvey, *C. goreensis* Guill. et Perr., *C. incana* L., *C. intermedia* Kotschy, *C. lanceolata* E. Mey., *C. maxillaris* Klotzsch, *C. retusa* L., *C. spectabilis* Roth, *C. striata* DC., and *C. usaramoensis* Baker. *C. intermedia* was chosen as the species most suitable for further investigation. This species possesses a fairly good palatability, and produces seed early and abundantly. It is less fibrous than the other species, and retains its leaves longer in the season.

1785. COUTINHO, L. DE A. and
SANTOS, A. 633.373:576.312.34
Novas contribuições para a cariologia do género *Trigonella* L. (New contributions towards the caryology of the genus *Trigonella* L.).
Agron. Lusitana 1943 : 5 : 349-61.
Cultivated lines of *T. Foenum-graecum* L. and certain other species collected from different parts of Portugal showed that the lines of *T. Foenum-graecum* differed in regard to the distribution of the $2n = 16$ chromosomes into the four different morphological classes.

A close affinity was observed between *T. gladiata* Stev. and *T. Foenum-graecum*, whereas *T. radiata* Benth (non Boiss.), *T. calliceras* Fisch and *T. coerulea* L. were classed together in a separate group.

T. polycerata with $2n = 28$ forms a third group.

1786. WERTH, E. 633.39:576.16
Der Spörgel, eine urgermanische Futterpflanze. (Zur Geographie und Geschicht der Kulturpflanzen und Haustiere XXIV. [Spurrey, a proto-Germanic fodder plant. (The geography and history of cultivated plants and domestic animals XXIV)].

Angew. Bot. 1943 : 25 : 349-54.

A review is given of the evolutionary history and archaeology of the fodder plant, *Spergula sativa*, which is derived from the wild species *S. arvensis*. The author's findings are interpreted in the light of his theories on the significance of Nordic culture in the development of European crop plants.

ROOTS AND TUBERS 633.4

1787. Redögörelse för resultaten av Skånes Frödlingsförenings stamförsök med foderrotfrukter 1929-1941. (Report on the results of the Scanian Seed Production Association's tests of strains of fodder roots 1929-41).

K. LantbrAkad. Tidskr. 1946 : 85 : 113-217.

Controlled samples of commercial seed were used in plot trials of 115 strains of various types of mangels, rutabagas and turnips. Special observations were made on the yield of dry matter of the different types.

1788. SUN, V. G. 633.42:582(51)
The evaluation of taxonomic characters of cultivated *Brassica* with a key to species and varieties—I. The characters.

Bull. Torrey Bot. Cl. 1946 : 73 : 244-81.

Detailed consideration is given to the evaluation of taxonomic characters likely to prove of value in classifying the genus *Brassica*. Special attention is devoted to Chinese forms.

1789. SUN, V. G. 633.42:582(51)
The evaluation of some taxonomic characters of cultivated *Brassica* with a key to species and varieties—II. The key.

Bull. Torrey Bot. Cl. 1946 : 73 : 370-77.

An abstracted version of this paper has been previously summarized (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 811).

A revised key to the species and varieties of cultivated *Brassicaceae* is given. The following species are recognized: *B. nigra* Koch, *B. carinata* Braun, *B. oleracea* L., *B. Napus* L., *B. campestris*, *B. chinensis* L. and *B. juncea* Coss.

1790. TIMOFEEV, N. N. 633.42-1.531.13:581.44(47)
(Inheritance of characters in vegetables in connexion with the origin of seeds from different branches).

Moskovskaja ordena Lenina Seljskohozjaistvennaja Akademija imeni K. A. Timirjazeva. Doklady Vypusk III. Naučnaja Konferencija 4-11 Iyunja 1945 g. (Timirjazev Agric. Acad. Moscow Proc. No. III. Sci. Conf. 4-11 June 1945) 1946 : 64-68.

Experiments with seeds of carrot, turnip, rape, radish, lettuce, spinach and other crops indicated that seed quality bears some relation to the order and situation of the branches from which the seeds are harvested. In general, the seeds obtained from the main stem and primary branches were heavier than those originating from subsidiary branches. Thus, in rape the weight of 1000 seeds from the main stem was 0.9-1.1 grm., while the weight of the same number of seeds from the primary and secondary branches was 0.6-0.9 and 0.4-0.7 grm., respectively. In addition the seeds obtained from branches in the upper portion of a plant were heavier and contained more fat than those originating from branches of the same order in the lower portion

of the plant. For example, in rape, seeds from the primary branches of the upper portion contained 31.1% fat, and those obtained from identical branches in the lower portion of the plant contained 29.6%. Further experiments, mainly with lettuce and radishes, showed that, although plants grown from seeds originating from different branches had a dissimilar rate of growth and development, such individual differences were not hereditary but were due to modifications conditioned by nutritional factors. This was clearly demonstrated by experiments with seeds obtained from hybrids between late and early varieties of lettuce and radishes, the expected segregation ratios in respect of colour and length of the vegetative period being given by the hybrids.

H. F.

1791. KRANTZ, F. A. 633.491:575
Potato breeding methods. III. A suggested procedure for potato breeding.

Tech. Bull. Minn. Agric. Exp. Sta. 1946 : No. 173 : Pp. 24.

Investigations on potato breeding are discussed with reference to (1) the relationships between flowering, pollen sterility, fruit development and tuber production, (2) the inheritance of pollen sterility, (3) the effect of selfing, and (4) the effects of crossing inbred selections. Breeding procedure is discussed, and described as consisting of the following three main phases: improvement of fertile pollen plants; utilization of these fertile pollen plants in crosses to obtain sterile and fertile pollen plants with desired characters; and further hybridization between selected pollen sterile and fertile plants of sufficient genetic diversity, to secure pollen sterile, sparsely blooming selections with promising commercial characters. A bibliography of 52 references is included.

1792. PERLOVA, R. L. 633.491:576.356.5:581.056(47)
(The self-fertility of South-American potatoes in the Western Pamir).
 Izvestija Akademii Nauk S.S.S.R. Serija biologičeskaja. (Bull. Acad. Sci. U.R.S.S., Sér. Biol.) 1945 : No. 4 : 460-70.

A large number of species in the diploid, tetraploid and even triploid groups produce fruits and seeds abundantly in the Pamir, though in Leningrad and elsewhere in the plains they are almost completely sterile. Moreover, a number of new caryological races have arisen, including a diploid race of *Solanum Maglia*, a hexaploid form of *S. Vallis-Mexici*, and various tetraploid races in the progeny of several high Andes species from the group *Andigena*. Data on the fertility of the different species in the Pamir are given.

Among the tetraploid species, *S. tenuifilamentum* and *S. mamilliferum* were seen to be the most fertile, though they are, of course, still inferior in this respect to the diploid and tetraploid species; *S. Commersonii* produced more pollen in the summer than the autumn months; *S. Vallis-Mexici* was almost completely sterile and *S. coyoacanum* completely so.

The pentaploid species all produced seeds, though they were mostly small.

The diploid species produced up to 200 and 300 seeds per berry, except *S. Jamesii*, which formed a large number of seedless fruits, and only about 0.18-0.22% of normal seeds. *S. Aracc-Papa* also only formed about 25 seeds per berry. No fruit formation has been obtained in *S. Vavilovii* and *S. cardiophyllum*, although they both produced abundant pollen; the fruits fell off in the bud stage. Diploid races of *S. Maglia* and the variety Aurora also set seed freely, and the tetraploid race of *S. cuencaicum* was more fertile than the maternal triploid. The hexaploid race of *S. Vallis-Mexici* was also more fertile than the triploid, but its fruits contained very few seeds. Crosses of the triploid species by other species characterized by good pollen production were also more fertile in the Pamir; for instance, good sets of fruit have been obtained by pollinating triploids of *S. Maglia* and *S. Commersonii* with the diploid *S. gibberulosum*, *S. dolichostigma* and *S. Macolae*, and tetraploids of *S. Molinue* and the variety Edelgard. These crosses were more successful than crosses of the same triploid species with *Centifolia* or with pollen of the pentaploid hybrid *S. Vallis-Mexici* (hexaploid) x Stärkeragis.

Very good sets were obtained on crossing the diploid race of *S. Maglia* with the above species. The same was observed with other diploids such as *S. Ciecae* and the haploids of the variety Aurora and also the tetraploid variety Edelgard.

In the conditions of north Caucasus, with a warm, humid maritime climate, fertility was also higher than at Leningrad; the best altitude for berry formation in the north Caucasus was 800-950 metres and in the Pamirs 2300-2500 metres.

A study was made of seedlings arising from seed collected in the Pamirs from the following triploid species: *S. Vallis-Mexici*, *S. Maglia*, *S. tenuifilamentum*, *S. mamilliferum* and *S. cuencanum*. The seedlings from *S. Vallis-Mexici* proved to be hexaploid, with $2n = 70-73$; in general type they resembled the parent species, but their dimensions were greater and pollen was produced in larger quantities; the plants crossed well with other species such as *S. tuberosum*, *S. gibberulosum* and *S. demissum*. In crosses with the variety Stärkeragis, pentaploid hybrids were produced which were also highly fertile and served as successful pollinators of *S. Commer-*
sionii, *S. Maglia* (triploid and diploid), *S. Ciecae* and the domestic variety Edelgard. All the seedlings of the triploid *S. Maglia* from the Pamir were diploid and would appear to have arisen by parthenogenesis. They were somewhat smaller than the triploid, but produced a larger number of tubers and were fertile. The other triploid species, *S. tenuifilamentum*, *S. cuencanum* and *S. mamilliferum*, produced tetraploid seedlings from seed formed in the Pamir; the tetraploids were all fertile.

1793. MURPHY, E. 633.491:577.16:578.08(74.1)
Storage conditions which affect the vitamin C content of Maine-grown potatoes.

Amer. Potato J. 1946 : 23 : 197-218.

Differences in varietal response to temperature and duration of storage, as shown by the effect upon vitamin C content, are reported. The varieties investigated were Irish Cobbler, Mohawk, Green Mountain, Chippewa, Katahdin and Sebago.

1794. KIRSTE, A. 633.491:581.6(43)
Die Abhängigkeit des Stärkegehalts der Kartoffel von den Wachstumsbedingungen und Anbaumassnahmen. (**The dependence of the starch percentage of the potato on growth conditions and cultivation measures**).
Landw. Jb. 1943 : 93 : 289-305.

In this account of the various factors conditioning the starch content of potatoes, information is presented in tabular form of the starch yields of a series of German varieties.

1795. KRISTENSEN, R. K. 633.491:581.6(48.9)
Kartofernes Vægtfylde og deres Indhold af Tørstof og Stivelse. (**The specific gravity of potatoes and their content of dry matter and starch**).
Tidsskr. Planteavl 1942 : 46 : 661-72.

This is a detailed report and discussion on experiments made between 1935-39 with ten varieties of Danish and foreign potatoes grown at the Tystrup, Studsgaard and Askov Stations, Denmark, in order to determine the relation between specific gravity and content of dry matter and starch. The statistical method used is discussed.

1796. CLARK, C. F. and 633.491:582(73)
LOMBARD, P. M.
Descriptions of and key to American potato varieties.
Circ. U.S. Dep. Agric. 1946 : No. 741 : Pp. 50.

Classification systems of commercial potato varieties are briefly reviewed. The authors have found the characters of the plant, flower, tuber and sprout to be the most useful for the identification of the chief varieties. A key of identification to 39 leading American varieties is presented.

Each of these varieties is described in detail. Notes are also included on 14 other varieties. The publication is illustrated with several excellent plates.

1797. CHITWOOD, B. G. and 633.491-2.6-1.521.6(73)
BUHRER, E. M.
The life history of the golden nematode of potatoes, *Heterodera rostochiensis* Wollenweber, under Long Island, New York, conditions.
Phytopathology 1946 : 36 : 180-89.

Differences among potato varieties in susceptibility to *Heterodera rostochiensis* have been noted. It is suggested that these differences are probably correlated with varietal differences in the ability to produce roots at temperatures below those at which nematode attack occurs.

1798. FERNANDEZ VALIELA, M. V. 633.491-2.8-1.521.6(42)
 Principales virus que afectan a la papa cultivada (con especial referencia a Gran Bretaña. [Principal viruses which affect the cultivated potato (with special reference to Great Britain)].
 Cent. Estud. Agron., Fed. Univ. B. Aires 1946 : Pp. 112.

This review of British work on potato viruses includes abundant references to varietal resistance of the potato to many of its virus diseases, and includes also an account of the genetical background of this resistance.

1799. ESBO, H. 633.491-2.8-1.521.6(48.5)
 En del vanliga potatissorters reaktion mot vissa vira. (The reaction of some of the common potato varieties to certain viruses).
 K. LantbrAkad. Tidskr. 1945 : 84 : 299-313.

The object of these experiments during 1941-44 was to study the different reactions of the varieties most commonly grown in Sweden, to X + Y virus infection. Tables are given showing the relation between the infection symptoms in the foliage and the yield of tubers.

1800. ROSS, A. F. 633.491-2.8-1.521.6(74.1)
 Susceptibility of Green Mountain and Irish Cobbler commercial strains to stem-end browning.
 Amer. Potato J. 1946 : 23 : 219-34.

Variations shown by different lots of Green Mountain potatoes in susceptibility to stem-end browning were found to be inherited and not due to such factors as storage conditions. In general the susceptible type of Green Mountain showed two to seven times as much stem-end browning as the more resistant strain, according to the environmental conditions. All lots of the Irish Cobbler variety were found to be susceptible to a similar extent.

FIBRES 633.5

1801. GROSZMANN, A. 633.51:575(81)
 Cinco anos de melhoramento de algodão pelo Departamento de Genética, Estatística e Biometria da Escola Superior de Agricultura do Estado de Minas Gerais-Viçosa. (Five years of cotton breeding by the Department of Genetics, Statistics and Biometry of the Agricultural High School of the State of Minas Gerais-Viçosa).

Ceres, Brasil 1943 : 5 : 94-114.

Under the heading of genetical work, reference is made to a collection of thirteen *Gossypium* species maintained by the institute, together with a large collection of cotton varieties. Tests have been made of reaction to *Verticillium albo-atrum* and two hybrids of *G. barbadense* and *G. hirsutum* have proved resistant. An entirely new leaf colour, described as ferrugem (rust), has appeared in the *F*₂ of a cross between Texas Green Lint and Virescent, and further studies are to be made on its inheritance.

In the practical breeding work, complex crossing is resorted to, and some of the selections under observation combine the characters of as many as five different parents. Growth habit of a type resembling Gatooma, fineness of lint, lint percentage and yield are the characters selected for. A specially promising *F*₂ selection is described which has a lint index of 12.9, a hundred seed weight of 19.15 grm., a lint percentage of 40.3 and a lint length of 28.2 + 2 mm. Some of the pure line selections from existing varieties such as Acala have also given promising results. The system of seed production and distribution is described.

1802. KASPARJAN, A. S. 633.51:576.356.5:581.04:575.127.2(47)
 Overcoming non-crossability in cotton.
 C.R. (Doklady) Acad. Sci. U.R.S.S. 1945 : 49 : 66-68.

Tetraploid forms of gusa cotton (*G. arboreum*) have been obtained by colchicine treatment of the germinated seeds. The tetraploid plants exhibited a deeper green colour and larger organs than the diploids. They produced a certain number of viable pollen grains, whose diameter was about 50% larger than that of the diploid grains. Hybrids between gusa cotton and American varieties were secured, possessing two chromosome sets of gusa and one chromosome set of the American parent. The tetraploids of gusa failed to cross with diploid plants.

1803. DUNLAP, A. A. 633.51:581.145.2.035(76.4)
Fruiting and shedding of cotton in relation to light and other limiting factors.
 Bull. Tex. Agric. Exp. Sta. 1945 : No. 677 : Pp. 104.
 The effects of different light intensities and daylengths upon vegetative growth and fruiting were investigated in several cotton varieties. Marked varietal differences in response to the various treatments are reported.

1804. 633.51:581.331.2:575.42(47)
Plant industry. 1. New achievements in selection.
 Agriculture, Moscow 1945 : No. 11 : 1-2. (Mimeographed).
 Experiments on using a limited number of pollen grains in the pollination of a cotton variety are reported. The material consisted of American and Egyptian cotton. The flowers of a given plant were self-pollinated by 20 grains from one flower, and each seed was planted separately. By this method plants were secured which showed a diversity of grades, and plants with an inheritable superiority to the original variety were obtained.

1805. 633.51:581.46:575.242:575.061.6(51)
 YANG, M. N. 633.51:581.45:575.242(51)
On the genetical behaviour of some mutants of Upland cotton.
 Acta Brevia Sinensis 1945 : No. 9 : p. 18. (Abst.). (Mimeographed).
 The characteristics and inheritance of the following mutants occurring in Upland cotton have been investigated at Kingyang, Shensi: the new mutants, virescent a (V_a), virescent c (V_c), virescent f (V_f), virescent l (V_l) and Kingyang crinkled leaf, and a mutant termed "irregular waved margin of leaves", previously described by Brown and Cotton under the name "round leaf" (cf. *Plant Breeding Abstracts*, Vol. VII, Abst. 1300). These mutants were found to be simple recessive characters. The four new virescent forms, virescent a, c, f and l, and virescent k (V_k) are morphologically distinct; V_a , V_c and V_k were found to be complementary factors. The Kingyang crinkled leaf character showed linkage with green leaf and green seed colour. The other mutants were independently inherited in relation to leaf colour, seed colour and other characters.
 The symbols for the inheritance of anthocyanin pigmentation in the New World cottons were not found to be applicable in the study of New World cotton. The author suggests a revision of the symbols.

1806. RAY, W. W. 633.51-2.3-1.521.6
Varietal reaction of cotton to bacterial blight.
 Phytopathology 1946 : 36 : p. 409. (Abst.).
 A large number of cotton varieties were tested in the seedling stage for their reaction to bacterial blight. In general the commonly grown commercial varieties showed most susceptibility. Certain lines such as Stoneville 20, Stoneville 62-1, Stoneville 462 and Oklahoma Triumph 92-1 possessed considerable resistance.

1807. YOUNG, V. H. and 633.51-2.484-1.521.6(76.7)
 HUMPHREY, L. M.
Varietal resistance to the *Fusarium* wilt disease of cotton.
 Bull. Univ. Ark. Agric. Exp. Sta. 1943 : No. 437 : Pp. 23.
 Tests of the resistance of cotton varieties to *Fusarium vasinfectum* Atk., conducted during the period 1934-39, are reported.

1808. 633.52(43.8)
 S....., G. 633.913(43.8)
A new rubber- and fibre-yielding plant.
 Int. Rev. Agric. 1944 : 35 : p. 32T.
 A note is given on *Asclepias konskiegensis*, a plant indigenous to Mexico and grown chiefly in the Konskie district of Poland. It yields 1400 kg. of fibre and 100 kg. of rubber per hectare.

1809. BORLAUG, N. E. 633.52-2.484:576.16:631.521.6
Variation and variability of *Fusarium lini*.
 Tech. Bull. Minn. Agric. Exp. Sta. 1945 : No. 168 : Pp. 40.
 Data are given on the susceptibility of flax varieties to physiological races of *Fusarium Lini* Bolley.

1810. HULTÉN, E. 633.584.3:582
Two new species of *Salix* from Alaska.
 Svensk Bot. Tidskr. 1940 : 34 : 373-76.
 Descriptions are given of the new species, *Salix arctolitoralis* Hult. and *S. flagellaris* Hult.

SUGAR PLANTS 633.6

1811. 633.61:575(47)
Industrial crops. 2. Sugar cane in the Soviet Union.

Agriculture, Moscow 1945 : No. 10 : 3-5. (Mimeographed).

The cultivation of sugar cane on irrigated lands has been found to be feasible in certain regions of Central Asia. A rum distillery, the first of the Soviet Union, is to be established in Tajikistan, and it will use the home-grown cane. The selection of early ripening varieties and the preliminary growing of grafts prior to planting have contributed to the successful cultivation. CP-28-19, CP-107 and No. 14 have proved to be the best adapted varieties. No. 14 is a cross between the wild sugar-cane of Central Asia and an American cultivated variety.

1812. BRANDES, E. W., 633.61:575(76.3)
 TAGGART, W. G. and
 BILLEAUD, G. L.
Release of new variety seed cane C.P. 36/13.

Sug. Bull., N.O. 1946 : 24 : p. 167.

The new cane C.P. 36/13 is to be released for commercial planting. In field tests it has compared favourably with C.P. 34/120 in yield of sugar per acre, but in cane per acre has been slightly inferior to this variety. In general, however, the new cane is higher than C.P. 34/120 in sucrose content. It equals C.P. 34/120 in fibre content and juice extraction. C.P. 36/13 is highly resistant to red rot and mosaic, and moderately susceptible to root rot. Its susceptibility to borer attack equals that of C.P. 34/120. The new variety is the most resistant to deterioration after cutting of any cane so far released in Louisiana.

1813. SIMON, E. C. 633.61:575(76.3)
Report on new varieties.

Sug. Bull., N.O. 1946 : 24 : 145-46.

Data are given on recently released and promising unreleased sugar cane varieties, which have been developed at the Louisiana Sugar Experiment Station.

1814. GEERTS, J. M. 633.61:575:9(92)
De europeesche suikerrietcultuur in Nederlandsch-Indië. (European sugar cane cultivation in the Dutch East Indies).

Landbouwk. Tijdschr., Wageningen 1941 : 53 : 223-39.

This paper traces the causes of the great increase in cane production in Java during the last century. Much information on the history, breeding, varieties and synonyms of cane is here made easily accessible to the breeder or economist.

1815. ABBOTT, E. V. and 633.61:575.12(76.3)
 SUMMERS, E. M.
Disease testing and initial seedling selection work at the Houma Station during 1945.

Sug. Bull., N.O. 1946 : 24 : 137A-38A.

New varieties have been developed from the following crosses: Co. 281 x U.S. 1694, Co. 281 x C.P. 27/34, Co. 281 x C.P. 1165, C.P. 281 x P.O.J. 2878, P.O.J. 2725 x C.P. 1165, and C.P. 1165 x C.P. 27/108.

1816. DILLEWIJN, C. VAN 633.61:576.16(56)
Indrukken van een reis naar Turkije. (Impressions of a journey to Turkey).

Landbouwk. Tijdschr., Wageningen 1940 : 52 : 309-19.

The following observations are of interest to plant breeders:—

Though Asia Minor is known to be the centre of origin of many cultivated plants, as is shown by the wild forms of *Triticum*, *Hordeum*, *Secale*, *Vicia*, *Pisum* and *Beta* and many fruit trees found

there, the country has not yet been thoroughly explored and each year new wild forms of cultivated crop plants are found. The writer records the discovery of extensive fields of wild *Saccharum spontaneum* L. which is already known in Formosa, Southern China, British India, Afghanistan, Turkestan, Iran, Egypt, Libya, Algeria and Sicily; its presence in southern Turkey was thus to be expected though it had not been hitherto confirmed.

The sweetness of such fruits as grapes, apples, pears and melons, grown in Turkey is remarkable, and an instance is recorded of Turkish melons being rejected in the markets of western Europe owing to their excessive sweetness. This intense sugar formation was also found in the periodical sampling of a sugar cane field in Adana, the sugar content being doubled in the course of a month and the level attained being quite exceptional for cane at such an early stage of development.

The work of the agricultural research institutes of the country is outlined. Research on the flora and climatic conditions is under way.

Exchange of seed or other plant material is sought.

Sugar beet is now grown and already meets the greater part of the home requirements.

1817. CROSS, W. E. 633.61:581.165
La rápida multiplicación de caña de las nuevas variedades. (The rapid multiplication of new varieties of sugar cane).
 Circ. Estac. Exp. Agríc. Tucumán 1946 : No. 134 : Pp. 2.

Details are given on the technique of rapid vegetative multiplication of sugar cane clones.

1818. ARCEAUX, G., MAYEAUX, L. C. (jun.) and HEBERT, L. P. 633.61:581.44:631.535.4
Some stalk characters of importance in sugarcane varietal comparison.
 Sug. Bull., N.O. 1946 : 24 : 176, 178.

Comparative data are given for 37 varieties with regard to stalk dimensions, number of eyes per ton of cane, cane required to plant one acre at the rate of two "running stalks" plus 10% lap, and number of eyes planted per acre at the same rate.

1819. GOUAUX, C. B. 633.61:581.6(76.3)
Milling tests of some important commercial canes.
 Sug. Bull. N.O. 1946 : 24 : p. 131.

Milling tests of the recently developed canes, C.P. 33-243, C.P. 34-120 and C.P. 33 310, are reported.

1820. SAMPAIO, S. C., CONAGIN, A. and MORAES, L. T. 633.61-2.8-1.521.6(81)
Contribuição para o estudo das variedades de cana de açúcar, cultivadas no estado de São Paulo. (Contribution towards the study of the sugar cane varieties cultivated in the state of São Paulo).
 (Rev. Agric., Piracicaba 1945 : 20 : 403-08.

The varieties originally introduced into Brazil as mosaic resistant have gradually deteriorated and substitutes have had to be looked for. A comparative test was made of the introductions which have remained and the two best proved to be Co. 290 and P.O.J. 213.

1821. ARCEAUX, G., HEBERT, L. P. and MAYEAUX, L. C. (jun.) 633.61.00.14(76.3)
Results of sugarcane variety tests in Louisiana during 1945.
 Sug. Bull., N.O. 1946 : 24 : 139-42, 159-61.

A summary is given of the results of field tests of recently released and promising unreleased varieties, in comparison with the chief commercial varieties, cultivated on the different soil types of Louisiana.

1822. GOUAUX, C. B. and TAGGART, W. G. 633.61.00.14(76.3)
Sugar cane test fields—Season of 1945.
 Sug. Bull., N.O. 1946 : 24 : 147-54.

The trials of unreleased and commercial sugar cane varieties conducted in the test fields of the Louisiana Sugar Experiment Station are reported.

1823. DECOUX, L.,
VANDERWAEREN, J. and
SIMON, M. 633.63:535.61-31
Un essai d'irradiation de graine de betterave en ultra-violets et en hautes fréquences. (**An irradiation test on beet seed with ultra-violet light and high frequency radiation**).
Publ. Inst. Belge Amélior. Better. 1944 : 12 : 509-15.
The irradiated sugar beet seeds germinated normally and exhibited no cytological aberrations.

1824. 633.63:575(49.3)
Dix années de recherches à l'Institut Belge pour l'Amélioration de la Betterave à Tirlemont de 1932 à 1941. (**Ten years of research at the Belgian Institute for the Improvement of the Beet at Tirlemont from 1932 to 1941**).
Bruxelles, 1945 : Pp. 436.
A comprehensive report is given of the various investigations on the sugar and forage beet carried out at the Belgian Institute for the Improvement of the Beet during the period 1932-41, and of the chief conclusions reached. Of particular interest are the chapters on sugar beet varieties and colchicine-induced polyploidy. The chapter on sugar beet varieties includes sections on the results of variety trials, the morphological characteristics of varieties in relation to the sugar content, varietal variability, the forage value of the foliage of different sugar beet varieties, chemical composition, the problems of estimating quality, the agricultural characteristics of the different varieties, abnormal types, wild beet material, selection work, and the commercial evaluation of varieties.

1825. 633.63:575.12(49.2)
GINNEKEN, P. J. H. VAN 633.416:575.12(4.92)
Instituut voor Suikerbietenteelt te Bergen op Zoom. (**The Institute for Sugar Beet Cultivation at Bergen op Zoom**).
Vakbl. Biol. 1941 : 21 : 65-69.
The past work of the Institute includes the testing of breeding material of sugar beets and fodder beets and statistical methods of experimentation.

1826. 633.63:575.125(73)
Hybrid vigor possible for sugar beet seed?
Sug. Beet J., Michigan 1946 : 11 : 256-57.
The production of F₁ hybrid sugar beet seed is very briefly mentioned. The use of a male sterility factor has made such production possible. The new hybrids, as yet suitable only for certain regions in the western United States, are rust resistant.

1827. ERNOULD, L. 633.63:576.353
La cytologie de la betterave. (**The cytology of the beet**).
Publ. Inst. Belge Amélior. Better. 1944 : 12 : 39-54.
Figures and descriptions are given of the course of mitosis in the sugar beet. The type of cell division is classified as euchromocentric.

1828. COLIN, H. 633.63:576.356.5:581.04
En attendant la betterave polyploïde. (**Waiting for the polyploid beet**).
Publ. Inst. Belge Amélior. Better. 1941 : 9 : 219-26.
The hope is expressed that polyploids of the sugar beet will be obtainable by means of the colchicine technique, and that these will exhibit superior agronomic qualities and will hybridize readily with such polyploid species as *Beta trigyna* and *B. patellaris*.

1829. DECOUX, L.,
ROLAND, G. and
SIMON, M. 633.63:576.356.5:581.04
Résultats préliminaires en vue d'étudier l'action de la colchicine sur le développement de la betterave. (**Preliminary results with a view to studying the action of colchicine on the development of the beet**).
Publ. Inst. Belge Amélior. Better. 1942 : 10 : 45-55.
No permanent chromosomal modifications could be obtained by treating the sugar beet variety Klein-Wanzleben WI with colchicine.

1830. DECOUX, L.,
 VANDERWAEREN, J.,
 SIMON, M. and
 GOIDSENHOVEN, W. VAN 633.63:581.143.26(49.3)
 La susceptibilité variétale de la betterave à la montaison précoce et tardive.
 Note préliminaire. (**The varietal susceptibility of the beet to early and late bolting. Preliminary note.**).
 Publ. Inst. Belge Amélior. Better. 1944 : 12 : 465-75.
 Information is presented on the frequency of early and late bolting in Belgian sugar beet varieties.

1831. DECOUX, L.,
 VANDERWAEREN, J.,
 SIMON, M. and
 ROLAND, G. 633.63:581.143.26:575 "793" (49.3)
 Recherches sur la betterave d'hiver effectuées à Tirlemont de 1932 à 1937.
 (**Researches on winter beet carried out at Tirlemont from 1932 to 1937.**).
 Publ. Inst. Belge Amélior. Better. 1942 : 10 : 229-53.
 Efforts to breed a winter sugar beet adapted to Belgian conditions have not proved successful. The bolting percentage in the strains studied has proved very high, while those forms that have been resistant to bolting and low temperature have yielded poorly. An examination of the properties of the so-called *Beta hivernalis* bred by Nemeth in Hungary has not given encouraging results; the plants bolted readily and their sugar yield was not high.

1832. ROUBAIX, J. DE and
 LAZAR, O. 633.63:581.174
 Chlorophylle et betterave. (**Chlorophyll and beet.**).
 Publ. Inst. Belge Amélior. Better. 1942 : 10 : 191-98.
 The content of chlorophyll pigments in the leaves of the four sugar beet varieties, Hilleshög, Klein-Wanzleben N, Kuhn and Dippe Frères WI, has been ascertained.

1833. BOUGY, E. 633.63:581.6:575.11
 Dissociation en F₃ de l'hybride Vauriac x Vilmorin A. (**Segregation in the F₃ of the hybrid Vauriac x Vilmorin A.**).
 Publ. Inst. Belge Amélior. Better. 1943 : 11 : 207-13.
 Details are given of the segregation in sugar content, as measured by refractive index, in the F₂ and F₃ progenies of Vauriac x Vilmorin A.

1834. DEDEK, J.,
 IVANCENKO, D.,
 NOVAK, J. and
 VASATKO, J. 633.63:581.6(43.7)
 L'influence du sol et de la variété sur le comportement de la betterave pendant la fabrication. (**The influence of the soil and variety on the behaviour of the beet during manufacture.**).
 Publ. Inst. Belge Amélior. Better. 1939 : 7 : 599-619.
 Varietal differences in the chemical composition of the roots and juices of four Czech sugar beets have been investigated. The varieties differed also in their behaviour during processing.

1835. DECOUX, L. and
 SIMON, M. 633.63:581.6:519.24
 Contribution à l'étude de la constitution des échantillons destinés à la détermination des principaux critères d'appréciation des betteraves. (**Contribution to the study of the constitution of samples designed for determining the principal criteria for evaluating beets.**).
 Publ. Inst. Belge Amélior. Better. 1941 : 9 : 169-74.
 Between 100 and 200 specimens of a sugar beet variety should be examined in order to calculate statistics relating to the weight and sugar content of the roots. For studies on foliage weight, 200 specimens should be taken.

1836. DECOUX, L.,
 ROLAND, G. and
 SIMON, M. 633.63:581.6:519.24
Etude de la variabilité des variétés de betteraves. (Study of the variability of beet varieties).
 Publ. Inst. Belge Amélior. Better. 1941 : 9 : 163-67.

The extent of variation, standard deviation and the coefficient of variation have been calculated for the root weight, percentage sugar content of the roots, total yield of sugar per root and foliage weight of eleven varieties of sugar beet. Intervarietal differences in these indices were unimportant. Percentage sugar content varied less than the other characters studied.

1837. DECOUX, L.,
 ROLAND, G. and
 SIMON, M. 633.63:581.6:519.24
Etude de la variabilité des variétés de betterave. II^e Communication. (Study of the variability of the varieties of beet. Communication II).
 Publ. Inst. Belge Amélior. Better. 1942 : 10 : 199-212.

A statistical analysis has been made of the variation in root weight, percentage sugar of the roots and total sugar yield per root of eleven Belgian sugar beet varieties. No important differences between varieties were observed in the coefficients of variations within each variety for each of the three characters studied. The coefficient of variation of the percentage sugar content of the roots was much lower than the coefficients of variation of the root weight and total sugar yield per root.

1838. DECOUX, L.,
 SIMON, M. and
 GOIDSENHOVEN, W. VAN 633.63:581.6:519.24
Etude de la variabilité des variétés de betterave. III^e Communication. (Study of the variability of beet varieties. Communication III).
 Publ. Inst. Belge Amélior. Better. 1943 : 11 : 127-47.

The amplitude of variation, standard deviation and coefficient of variation have been calculated for the root weight, percentage sugar content of the root and total sugar yield per root for 17 Belgian sugar beet varieties. Intervarietal differences in the value of the various statistics proved unimportant. The coefficient of variation of percentage sugar content was lower than that of the other two characters studied. The coefficients of variation for some varieties vary according to the year of the test; in other cases they remain comparatively constant.

1839. DECOUX, L.,
 SIMON, M. and
 GOIDSENHOVEN, W. VAN 633.63:581.6:519.24(49.3)
Etude de la variabilité des variétés de betterave. IV Communication. (Study of the variability of beet varieties. Communication IV).
 Publ. Inst. Belge Amélior. Better. 1944 : 12 : 451-63.

Details are presented on the extent of variation, standard deviation and coefficient of variation of the root weight, percentage sugar content of the root and total sugar yield per root of three Belgian sugar beet varieties.

1840. BOUGY, E. 633.63:581.6:575.11
Dissociation d'hybrides de betteraves sucrières et fourragères. (Segregation of hybrids of sugar and fodder beets).
 Publ. Inst. Belge Amélior. Better. 1942 : 10 : 35-43.

The F₂ and F₃ progenies of the crosses Jaune de Vauriac fodder beet x Kuhn sugar beet and Jaune de Vauriac x Vilmorin A sugar beet have been examined for the following characters: root colour, root weight, percentage dry weight and percentage sugar content. In the F₁, high sugar content tends to be dominant; the reappearance of the parent types in the later generations is delayed and the author expresses doubts as to whether the segregation behaviour observed is Mendelian.

1841. DECOUX, L.,
VANDERWAEREN, J. and
SIMON, M. 633.63:581.6:575.12
La culture associée des variétés de betterave. (**The combined culture of beet varieties**).
Publ. Inst. Belge Amélior. Better. 1942 : 10 : 213-18.
A mixed sowing of Hilleskög, Klein-Wanzleben N and the F₁ hybrid yielded less satisfactorily than pure stands of Hilleskög.

1842. DEDEK, J. and
IVANCENKO, D. 633.63:581.6:575.42
L'amélioration par la sélection de la valeur industrielle de la betterave. (**Improvement of the industrial value of the beet by selection**).
Publ. Inst. Belge Amélior. Better. 1941 : 9 : 227-50.
A comparison between sugar beet strains that had been subjected to different intensities of artificial selection showed that, though the more rigorously selected forms were characterized by a higher percentage sugar content, the root weight was lowered and the total yield of sugar per root practically unchanged. Selection however did appear to reduce the nitrogen content and improve the quality of the juice.

1843. DECOUX, L.,
VANDERWAEREN, J. and
SIMON, M. 633.63:581.6:581.45
Variétés de betterave à grand et à petit bouquet foliaire. (**Large and small topped beet varieties**).
Publ. Inst. Belge Amélior. Better. 1942 : 10 : 219-28.
Recent selection work has been directed to obtaining large topped strains from small topped sugar beet varieties and vice versa. Comparative tests have shown however that small topped strains do not necessarily yield more sugar than the corresponding large topped forms. The large topped variety Zwaanesse 2 for instance, has a higher root, sugar and foliage yield than its small topped equivalent, Zwaanesse 1. Similarly, the normal strain of Dippe Frères WI yields better than its small topped equivalent.
It is desirable that the foliage yield of the small topped varieties should be increased without prejudice to the valuable characteristics of these forms.

1844. DECOUX, L.,
VANDERWAEREN, J. and
SIMON, M. 633.63:581.6:581.45
Variétés de betterave à grand et à petit bouquet foliaire. II. Communication. (**Large and small topped beet varieties. Communication II**).
Publ. Inst. Belge Amélior. Better. 1944 : 12 : 477-83.
Comparative experiments with small and large topped strains of the Zwaanesse and Kuhn varieties have indicated that size of the tops and sugar yield per root tend to be inversely correlated.

1845. DECoux, L.,
VANDERWAEREN, J. and
SIMON, M. 633.63:581.6:631.8(49.3)
L'influence variétale sur la maturation de la betterave sucrière. II Communication. (**Varietal influence on the maturation of the sugar beet. Communication II**).
Publ. Inst. Belge Amélior. Better. 1941 : 9 : 19-42.
Data are given on the root weight, percentage sugar content of the roots, total sugar yield per root, dry matter content, nitrogen content and juice quality of nine Belgian sugar beet varieties. Varietal differences in response to nitrogen added as a fertilizer were insignificant.

1846. DECOUX, L.,
VANDERWAEREN, J. and
SIMON, M. 633.63.00.14(49.3)
Les variétés de betterave sucrière en Belgique de 1934 à 1938. (**The varieties of sugar beet in Belgium from 1934 to 1938.**)
Publ. Inst. Belge Amélior. Better. 1939 : 7 : 675-708.
Details are given of the sugar yield, bolting percentage, foliage yield, juice quality and other characteristics of Belgian sugar beet varieties.

1847. DECOUX, L.,
VANDERWAEREN, J.,
ROLAND, G. and
SIMON, M. 633.63.00.14(49.3)
Les variétés de betterave sucrière en Belgique de 1935 à 1939. (**The varieties of sugar beet in Belgium from 1935 to 1939.**)
Publ. Inst. Belge Amélior. Better. 1941 : 9 : 139-61.
Information is presented on the sugar content, bolting resistance, industrial suitability, disease resistance and germination capacity of Belgian sugar beet varieties.

1848. DECOUX, L.,
VANDERWAEREN, J. and
SIMON, M. 633.63.00.14(49.3)
Les variétés de betterave sucrière en Belgique de 1937 à 1941. (**The varieties of sugar beet in Belgium from 1937 to 1941.**)
Publ. Inst. Belge Amélior. Better. 1942 : 10 : 159-89.
Details are given on the sugar content, resistance to bolting, disease resistance and germination capacity of Belgian sugar beet varieties. Foliage yield and the quantity of sugar in the roots are inversely correlated.

1849. DECOUX, L.,
VANDERWAEREN, J. and
SIMON, M. 633.63.00.14(49.3)
Les variétés de betterave sucrière en Belgique de 1938 à 1942. (**The varieties of sugar beet in Belgium from 1938 to 1942.**)
Publ. Inst. Belge Amélior. Better. 1943 : 11 : 103-26.
Data are presented on the sugar yield, bolting resistance, industrial quality, disease susceptibility and germination capacity of Belgian sugar beet varieties.

1850. DECOUX, L.,
VANDERWAEREN, J.,
SIMON, M. and
GOIDSENHOVEN, W. VAN 633.63.00.14(49.3)
Les variétés de betterave sucrière en Belgique de 1939 à 1943. (**The varieties of sugar beet in Belgium from 1939 to 1943.**)
Publ. Inst. Belge Amélior. Better. 1944 : 12 : 395-450.
Extensive details are given on the sugar yield, bolting resistance, juice purity, disease susceptibility and germination capacity of Belgian sugar beet varieties.

STIMULANTS 633.7

1851. HENDERSON, R. G. 633.71-2.484-1.521.6
Field and greenhouse studies on 16 tobacco hybrids and varieties.
Phytopathology 1946 : 36 : 400-01. (Abst.).
Observations are reported on the reaction of seven commercial flue-cured varieties and nine lines selected from crosses between commercial varieties and Turkish tobacco to root rot caused by *Thielaviopsis basicola* and other organisms. The commercial variety, Yellow Special, was moderately resistant, but all the other commercial varieties proved to be very susceptible. Six hybrids were highly resistant and three were intermediate in reaction.

1852. VALLEAU, W. D. 633.71-2.8-1.521.6:575.127.2(76.9)
Breeding tobacco varieties resistant to mosaic.

Phytopathology 1946 : 36 : p. 412. (Abst.).

The *N* factors of *Nicotiana glutinosa* and the a_1a_2 factors of Ambalema provide two separate sources of mosaic resistance. The *N* factor localizes the virus in necrotic spots if infection is light, or may result in systemic necrosis if infection is heavy. The recently developed *NN* varieties, Ky. 52 and Ky. 34, are being cultivated extensively in Kentucky without mosaic injury. By crossing Ky. 16 with *N. glutinosa* and back-crossing several times, varieties possessing the *NN* factor pair have been produced, somewhat earlier and lower yielding than Ky. 16 but otherwise satisfactory. The *NN* type of resistance has also been successfully transferred to Little Crittenden, Little Orinoco, Brown Leaf and One Sucker from Holmes Samsun. In over ten years' breeding no satisfactory burley or dark fire-cured tobaccos containing the Ambalema factors for resistance have been obtained.

1853. WELLENSIEK, S. J. 633.72:575.42(92)

Biologisch en landbouwkundig werk in Nederlandsch Indië. 19. Theeselectie. (**Biological and agricultural work in the Dutch Indies. 19. Tea selection.**)

Vakbl. Biol. 1939 : 20 : 201-10.

An outline is given of the scientific and economic basis of research on tea in the Dutch East Indies, with special reference to the selection work of C. Stuart and other investigators including the author himself. The procedure in nursery selection is described.

1854. KRUG, C. A. 633.73:575(81)

Melhoramento do cafeiro. (**Improvement of coffee.**)

Bol. Superintend. Serv. Café, São Paulo 1945 : 20 : 1038-46.

A description is given of a number of varieties of *Coffea arabica* not hitherto well known. These include the ever-bearing variety Semperflorens, which is resistant to die-back and equal in quality and yield to the original Bourbon; Caturra, a variety with shorter internodes than Bourbon and much greater yield, which however gives it a tendency to die back; the semi-dwarf variety San Ramon and the variety Cera with wax coloured seeds.

In the other species the most interesting are the variety Kouillou of *C. canephora*, inferior in quality but less exacting as to cultural conditions, and *C. Dewevrei* var. *excelsa*, a tetraploid form of which has given annual yields per plant of up to 50 kg. of berries, and is exceptionally vigorous; it is, however, self-sterile.

The most promising varieties recommended for planting in the better soils are various Bourbon selections, of which C-44 is specially mentioned as being earlier in flowering and ripening and more resistant to die-back than the others. For less fertile soils several Maragogipe selections are recommended.

1855. MENDES, J. E. T.,

KRUG, C. A. and

BERGAMIN, J.

633.73:575(81)

Relatório de uma viagem de estudos sobre a lavoura cafeeira nos estados do Rio de Janeiro e Espírito Santo. (**Report on a study tour on coffee work in the states of Rio de Janeiro and Espírito Santo.**)

Bol. Superintend. Serv. Café, São Paulo 1945 : 20 : 1025-34, 1094-1104.

A tour was made of all the main coffee growing areas of the states concerned, special attention being given to infestation by *Hypothenemus hampei*. An account is given of the general conditions such as soils, climate etc. and of the varieties grown in the different areas. Special mention is made of some plantations of the variety Conillon (Kouillon) of *Coffea canephora*, which was distinguished by great vigour and capacity for survival under the most unfavourable cultural conditions. Although its fruits are small it is thought worthy of attention by plant breeders.

1856. MENDES, A. J. T. 633.73:576.356.5

Citologia de *Coffea*. (**Cytology of Coffea.**)

Rev. Agric., Piracicaba 1945 : 20 : 412-15.

The existence of a polyploid series has been demonstrated, with *C. canephora*, *C. Dewevrei*, *C. liberica* and *C. congensis* diploid ($2n = 22$) and *C. arabica* tetraploid ($2n = 44$). The diploid group are self-incompatible, the tetraploid species self-compatible.

It is now definitely established that the seed is endospermous. Polyembryonic seeds and seed without embryos have been found in *C. arabica* and *C. canephora*, but no haploid seedlings have yet been produced from the polyembryonic seeds. In *C. arabica* however plants with both $2n = 22$ and $2n = 88$ have been found among the seedlings; also $2n = 66$ plants. These hexaploids have been crossed with octoploids and tetraploids, from which pentaploid and aneuploid plants with $2n = 52$ have been obtained. Triploid hybrids have been produced by crossing *C. arabica* with various diploid species.

By colchicine treatment, tetraploid plants have been produced in *C. Dewevrei* and *C. canephora*. Also, by growing freshly cut twigs in a colchicine solution and then grafting them on to an appropriate stock, it has been possible to effect chromosome duplication in triploid and diploid material and so, for instance, produce fertile hybrids of *C. arabica* and *C. canephora* and synthesize an artificial Bourbon plant from a "monosperma" type.

CONDIMENTS 633.84

1857. GYÖRFFY, B. 633.842:577.16
 A paprika C-vitaminjáról. II. Különböző paprika-fajták C-vitamin tartalma
(Vitamin C in paprika. II. Vitamin C contents of several varieties of paprika).

Arb. Ung. Biol. Forsch-Inst. 1942 : 14 : 297-313.

Vitamin C content of the plant during development is found to increase until the fruit becomes ripe. In soft over-ripe fruits a decrease is noted. Different methods of storage were investigated. The vitamin C values of 20 varieties were determined. Variety was found to affect vitamin C content, and the range of values for each variety was large. There is some indication that vitamin C content is higher in the case of small, thin-walled fruits. The difference found between varieties may be due to this. No correlation was obtained between vitamin C content and pigment concentration.

E. E.

OIL PLANTS 633.85

1858. DIONIGI, A. 633.853.55:575(45)
 Il miglioramento genetico del ricino. La creazione della varietà "M.6".
(The genetic improvement of the castor oil plant and the creation of the variety M.6).

Genetica Agraria, Roma 1946 : 1 : 9-31.

The author started in 1934 by assembling a number of imported varieties and various Italian varieties, the best of these being Rosso Veronese, characterized by the highest oil content and quality, and Comune Piccolo, an extremely early variety. Out of 65 types studied, 47 were discarded as being too late, a further 15 as being unsatisfactory in yield, leaving two types similar to Rosso Veronese but slightly earlier and one like Comune Piccolo but slightly earlier. Crosses were made between the Rosso Veronese and Comune Piccolo types. By growing in a glasshouse at Rieti and using Comune Piccolo as the maternal parent, it was possible to raise three generations in a year; the parent generation was harvested on 28 May 1935, and the first generation in early September. Only part of this seed was grown under glass and a preliminary selection was made; all late types were recognizable as soon as the first inflorescence began to be formed and these were discarded. By selecting for earliness it was found that short stature was also attained. Seed size and tendency to dehiscence of capsules were also characters which did not vary with growth conditions and could be selected in greenhouse plants. The seed from the selected plants was sown in the field in April 1936. The remainder of the F_1 seed was also sown at the same time, some in the open and some in the greenhouse. Further selection was carried out in the succeeding seasons. The line M.6 was the most promising selection from the cross and has yielded an average of over 20 quintals per hectare as compared with under 10 quintals for the original Rosso Veronese. The superiority in yield is particularly evident when the plants are sown at close spacings. The variety has done well in central Italy and also in the south, where it matures in about 100 days; its short stature and low inflorescences facilitate harvesting and its extreme earliness makes it a much better precursor for wheat and other crops than previously existing varieties.

1859. WEIBEL, R. O. and WOODWORTH, C. M. 633.853.55.575.12:578.08(77.3)
Use of the natural crossing plot in making castor bean hybrids.
 J. Amer. Soc. Agron. 1946 : 38 : 563-65.

The use of the natural crossing plot to produce castor bean hybrid seed is described, and the possible uses of the method are discussed.

1860. PERRY, B. A. 633.854.559:576.312.35:582:576.16
Cytological relationships in the Euphorbiaceae.

Va. J. Sci. 1942 : 3 : 140-44.

Studies were made of the geographical distribution, plant morphology, and chromosome numbers and morphology of about 100 species of the Euphorbiaceae. Except for the genus *Euphorbia*, considerable uniformity in shape and size of the somatic chromosomes was observed throughout the genera examined. It is reported that the chromosome numbers ranged from $2n = 12$ in *Euphorbia dulcis* L. to $2n = c.200$ in *E. ferox* Marlot and $2n = c.224$ in *Acalypha Wilkesiana* var. *musiaca*. The chromosome numbers of distantly related genera indicate the presence of several chromosome series. Genera and species considered to be the most primitive among those studied were found to have a basic number of 8, suggesting that this is the primary basic number of the family. Secondary basic chromosome numbers of 6, 7, 9, 10 and 11 were observed. The frequency of polypoidy in the Euphorbiaceae was estimated as approximately 50%. Data are given on the relative distribution of diploids and polyploids. Annual species were found to have a lower average chromosome number than the perennial species.

1861. CHAIDZE, I. 633.854.56(47)
[The tung tree (*Aleurites fordii*)].

Socialističeskoe Zemledelie (Socialist Agriculture) 1945 : No. 179 : p. 4.

The chief plantations of tung trees are situated in the Georgian S.S.R., where, before the war, they occupied an area of 16,000 ha. Small plantations have been grown in Azerbaijan and the Soci and Adler districts of the Krasnodar province. Further tests have recently been carried out in new districts of Transcaucasia. The Chinese species, *A. Fordii*, and the Japanese species, *A. cordata*, have been grown on the experimental plots. The former species proved to be more frost and drought resistant, and gave greater yields than the latter. It is estimated that extensive new plantations can be established in Transcaucasia in the districts where neither tea nor citrus fruits can be grown.

MEDICINAL PLANTS 633.88

1862. Medicinal plants in the USSR. 633.88(47)

Agriculture, Moscow 1945 : No. 10 : 9-11. (Mimeographed).

An account is given of some medicinal plants.

1863. HEEGER, E. F. 633.88:575(43)
 Sortenkundliche Untersuchungen zur Kenntnis der deutschen Baldriansorten.
(Investigations on the identification of the German varieties of valerian).

Heil- u. Gewürzpf. 1942 : 21 : 1-35. [From Forschungsdienst 1944 : 17 : p. 34].

By selection applied to three strains of commercial valerian, a certain uniformity has been attained, so that three varieties are now available for the seed trade, namely, Erfurt, Oderland and Oberlausitz. They differ mainly in the pubescence of the fruits and the breadth of the leaflets. The chemical composition must, however, also be used to ensure an absolutely reliable diagnosis. The Oderland variety showed a high content of the valuable principle in experiments lasting several years.

1864. SHIMOYA, C. 633.88:576.354.4:581.162.51
 Observações citológicas em chaulmoogra. (Cytological observations on chaulmoogra).

Ceres, Brasil 1944 : 6 : 76-81.

Cytological studies on chaulmoogra (*Taraktopterus Kurzii* King) revealed that the pollen grains in the flowers of the hermaphrodite plants always degenerated after development, whilst only in the flowers of the unisexual male plants was viable pollen produced.

Observations have shown that a larger quantity of fruit is set when male and hermaphrodite plants are grown in close proximity, and it is suggested that future investigations should include experiments with grafting branches of one type of plant on to the other. J. G. H.

1865. CAMP, W. H. 633.885.1:575.22:582(8)
Biochemical clines, polymorphic populations, and the problems of specific delimitation on the *Cinchona* population of Ecuador.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 234. (Abst.).

It is shown that the *Cinchona* populations of the Andes are hardly susceptible to classical taxonomic treatment. The morphological polymorphy and the clines shown by biochemical properties indicate that specific delimitation is of doubtful service, especially as isolated populations are seldom separated by sterility barriers.

RUBBER PLANTS 633.91

1866. BALDWIN, J. T. (jun.) 633.912:582:575.127.2
A first interpretation. 633.912-2.421.9-1.521.6

Amer. J. Bot. (Suppl.) 1946 : 33 : 215-16. (Abst.).

The genus *Hevea* consists of nine or fewer hybridizing species which could even be reduced to a single species. Many segregants of interspecific hybridization have been given specific status by taxonomists. The centre of genetical variability of the genus is the Rio Uaupés region of Brazil. *H. rigidifolia* appears to be resistant to South American leaf blight.

1867. NAVASHIN, M. S., 633.913:576.356.5:581.04:575(47)
 GERASSIMOVA, E. N. and
 CHEREDNICHENKO, A. F.
Tetraploid kok-saghyz as a variety of improved productivity.
 C.R. (Doklady) Acad. Sci. U.R.S.S. 1945 : 47 : 432-35.

Tetraploids of *Taraxacum Kok-saghyz* show the following characters in comparison with the diploids: larger seeds, more vigorous seedlings, higher root yield and increased weight of the individual root, steeper conical root shape, wider lactiferous vessels which facilitate the flow of latex, an increase in the diameter of the coagulated rubber filaments, and a higher grade of rubber polymerization. The rate of plant development and the root rubber content were similar in the tetraploids and diploids. The value of tetraploid kok-saghyz as breeding material is discussed. It is expected that the chief defect of reduced fertility can be eliminated by selection.

1868. ABBE, L. B. 633.913:578.6
A rapid histological technic for staining latex in roots of *Taraxacum Kok-saghyz*.

Stain Tech. 1946 : 21 : 19-22.

A freezing technique is described by means of which permanent slides of *T. Kok-saghyz* root sections can be produced, the latex being retained *in situ*.

1869. SØRENSEN, T. and 633.913:581.163:576.356.5
 GUDJÓNSSON, G.
Spontaneous chromosome-aberrants in apomictic *Taraxaca*. Morphological and cyto-genetical investigations.
 Det Kongelige Danske Videnskabernes Selskab, Biol. Skrift., København 1946 : 4 : No. 2 : Pp. 48.

Cytological and morphological descriptions are given of spontaneous mutations observed in apomictic Danish *Taraxaca*. It is concluded that the triploid apomicts are autopolyploid.

1870. LYSENKO, T. 633.913:581.165.71:581.6(47)
Industrial crops. 1. A new method of growing kok-saghyz.
 Agriculture, Moscow 1945 : No. 10 : 2-3. (Mimeographed).

It has been found that *Taraxacum Kok-saghyz* grown from grafts, produces heavier roots and a higher rubber content than when grown directly from seed. The rubber content in one-year-old roots has been found to be one and a half times the content of roots produced from seed.

1871. STEVENS, O. A. 633.913:581.41:575.22(78.4)
***Asclepias syriaca* and *A. speciosa* distribution and mass collections in North Dakota.**
Amer. Midl. Nat. 1945 : 34 : 368-74.
Variations in leaf measurements, flower size and shape, and fruit form have been studied in wild collections of *A. syriaca* and *A. speciosa* in North Dakota. Data are also given on the distribution of the two species.

FRUITS AND NUTS 634

1872. TIMOFEEV, N. N. 634:007:575(47)
(I. V. Mičurin and his work).
Moskovskaja ordena Lenina Seljskohozjaistvennaja Akademija imeni K. A. Timirjazeva. Doklady Vypusk III. Naučnaja Konferencija 4-11 Iyunja 1945 g. (Timirjazev Agric. Acad. Moscow Proc. No. III. Sci. Conf. 4-11 June 1945) 1946 : 59-64.
On the occasion of the tenth anniversary of Mičurin's death, the author presents a brief review of the work of this famous Russian horticulturist.

1873. 634:575(47)
Fruit growing.
Agriculture, Moscow 1945 : No. 8 : 4-5. (Mimeographed).
Notes are given on (1) the breeding work of the experimental stations of the Michurin Institute which includes the production of frost resistant apple, pear, apricot and raspberry varieties; (2) the stone fruit breeding work of the Nikitsky Botanical Garden Institute; and (3) the breeding of early hybrid varieties of grapes at the Central Asia Station in Tashkent.

1874. 634:575(47)
Horticulture.
Agriculture, Moscow 1945 : No. 10 : 5-7. (Mimeographed).
The Japanese tangerine variety, Unshiu, one of the varieties cultivated in the Sochi region, shows the serious breeding drawback of hardly producing any seeds. By artificial cross-pollination, increased seed production has been obtained, and the Unshiu variety is now being used in a hybridization programme.
Selection for frost resistance and high yield in the avocado is in progress.

1875. 634:575(47)
635:575(47)
I. V. Michurin, the great reorganizer of nature.
Agriculture, Moscow 1945 : No. 6 : 1-3. (Mimeographed).
A short account is given of the breeding work and theoretical principles of I. V. Michurin with fruit trees, vegetables, cucurbits, and ornamental plants.

1876. KOBEL, F. 634:575(49.4)
Jahresbericht 1944 der Eidg. Versuchsanstalt für Obst-, Wein- und Gartenbau in Wädenswil. (Annual report for 1944 of the Federal Research Institute for Fruit, Vine and Vegetable Culture at Wädenswil).
Landw. Jb. Schweiz 1945 : 46 : 159-75.
In fruit breeding the primary aim has been to obtain apples which will keep well and be satisfactory commercially. Several thousand seedlings from crosses are being tested at Oeschberg-Koppigen. Foreign and local varieties are still being tested. To render the preliminary trials of varieties from the different countries comparable with the preliminary trials of apples produced by the Institute, two scions of each variety will be grafted on E. M. types I, II and IX. Apple varieties have been crossed to obtain vigorous stocks for apple standards. Amongst these crosses vigorous types which take root easily were sought. The systematic description of apple and pear varieties has been begun, with the aim of making an extensive inventory of these fruits, like that existing for cherries. In viticulture the main problem has been the breeding of an early ripening, high-yielding blue grape for wine making. New crosses have been effected. The difficult problem of obtaining

valuable direct producers is also being attacked. Variety trials of vines for producing dessert and wine grapes continue. Attention is being given to the selection and testing of valuable clones; this question is important for the viticulture of eastern Switzerland, especially in the case of Blauburgunder vines.

Cultivation trials were made with new strains of blue kohlrabi to compare them with the valuable white variety, Rogglis Freiland; none of the new products was as satisfactory as the white variety. The new turnip, Blauwunder, proved disappointing, the root becoming woody at an early stage.

The runner bean Brissago from Ticino has proved very sturdy and high yielding. It is recommended for small gardens, but not for market gardens.

E. W.

1877. LANTZ, H. L.

634:575(73)

Fruit breeding contributes to better living.

Virginia Fruit 1945 : 33 : 18-24.

Fruit breeding work in the United States is discussed.

1878.

634:575(79.4)

Yearbook of the California Avocado Society for the year 1943 (1944) :

Pp. 103.

Rounds, M. B. *1943 Observations on avocado varieties.* (pp. 13-16).

Avocado varieties are discussed.

Fairchild, D. *Some observations on the cherimoyas of Colombia and Guatemala.* (pp. 66-70).

Observations on the annonaceous fruits of Colombia and Guatemala are presented; their possible value in breeding work in California is indicated.

1879.

634:575(79.4)

Yearbook of the California Avocado Society for the year 1944 (1945) :

Pp. 89.

Charts of variety adaptations. (pp. 14-16).

Tables give the adaptability and several other characters of recommended avocado varieties.

Webber, H. J. *The guava and its propagation.* (pp. 40-43).

Propagation by root-cuttings is considered to be the most satisfactory method of propagating the guava.

Schroeder, C. A. and [The cattley (commonly known as the strawberry guava)].
Coit, J. E. (pp. 44-47).

An account is given of the cattley or strawberry guavas, *Psidium littorale* and *P. littorale* var. *lucidum*, including their commercial possibilities.

1880.

634:575(79.4)

Yearbook of the California Avocado Society for the year 1945 (1946) :
Pp. 123.

Report of the Variety Committee on avocados. California Avocado Society 1945. (pp. 12-16).

Avocado varieties are discussed.

Charts of variety adaptation. (pp. 17-18).

Data on the adaptability and various other characters of recommended avocado varieties are tabulated.

Griswold, H. B. *The Hass avocado.* (pp. 27-31).

The Hass avocado is described. The variety has a wide adaptability and long season. The fruits are medium sized, small seeded, excellent in quality, and suitable for transport. Its single disadvantage is the black colour of the fruit when soft.

Schroeder, C. A. *The nomenclature of certain subtropical fruits.*
(pp. 36-40).

Recommendations are made for the nomenclature of 14 subtropical fruits.

Lammerts, W. E. *The avocado breeding project.* (pp. 74-80).

An account is given of avocado breeding work of the University of California.

*Argles, G. K. and
Topper, B. F.* *Progress report on the planting of imported avocado
pear varieties in Jamaica. (pp. 84-86).*

The performance of introduced avocado varieties in Jamaica is discussed.

Hodgson, R. W. *Research on the avocado. (pp. 87-90).*

In the variety Fuerte evidence of a high-yielding and a low-yielding strain has been obtained.

1881. DOORTJES, J. A. 634:581.162.3(49.2)
Bestuivingsproeven. (**Pollination tests**).
Fruitteelt 1941 : 31 : 293-303.

Tabulated results are shown of pollinations of apples and various other fruits and berries, carried out mainly in the Pomological Garden at Tiel.

1882. KOBEL, F. 634:581.162.5
Study on the conditions of fecundation of pomaceous and stone fruit species.

Int. Rev. Agric. 1943 : 34 : 398T-407T.

A review is given of investigations on sterility in pome and stone fruits.

1883. TURRELL, F. M. 634:581.47:578.08
Estimating fruit surfaces.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 224. (Abst.).

Tables have been prepared for measuring the superficial area of fruits approximating in shape to an oblate or prolate spheroid.

1884. RUDORF, W. 634:581.6(43)
635:581.6(43)
Die Pflanzenzüchtung im Dienst der Konservierung von Obst und Gemüse.
(**Plant breeding in the service of fruit and vegetable preserving**).
Forschungsdienst 1944 : 17 : 583-90.

A general review is presented of the work done in Germany on developing varieties suitable for preserving, dehydrating and freezing. It is important that varieties for preserving should retain their flavour, should have a high vitamin and nutrient content, and should be free from fungous, bacterial, insect, frost and drought injury. They must also stand up well to industrial processing. The author emphasizes that small cell size is a desideratum, a characteristic often associated with a high dry matter content.

Special reference is made to varietal differences in the apple with respect to the content of vitamin C, pectin, sugar and organic acids, and also to the tendency to undergo discoloration. Short notes are added of work done at Müncheberg on apples, pears, and cherries.

1885. DOORTJES, J. A. 634.1:581.163:578.08
Fruchtvermehrung zonder bevruchting (parthenocarpie). [**Fruit formation without fertilization (parthenocarpy)**].
Fruitteelt 1942 : 32 : 43-45.

Many instances of parthenocarpic fruits are cited from various authorities. Experiments at the Tiel Pomological Garden with "Kernlos", a product for promoting parthenocarpic fruit formation, resulted in a few isolated seedless fruits of apples and pears. Experiments in which the stigmas of the apple, Transparente de Croncels, were cut off were also practically a failure. None of the seeds from the few parthenocarpic fruits obtained was viable.

Investigations are in progress to find out (1) whether the various pear trees that have formed fruits without intervention or fertilization belong to one or several varieties; and (2) whether the seedless pear, and possibly ultimately a coreless type of pear, may be of importance in horticulture. The second problem will be studied by transferring pollen from seedless pear trees to good varieties in order to obtain high quality hybrids without seeds and, if possible, without core. The value of such forms for dessert and preserving would be great and they would also be welcomed by growers as not needing pollination and being less susceptible to night frosts.

1886. MOORE, R. C. 634.11:575(75.5)
Some results of apple breeding at V.P.I.

Virginia Fruit 1945 : 33 : 63-67.

An account is presented of apple breeding at the Virginia Agricultural Experiment Station.

1887. STRUCKMEYER, B. E. 634.11:581.162.3:581.46
Hand pollination of Delicious in the Wenatchee, Washington orchards.

Amer. Fruit Gr. 1946 : 66 : No. 5 : 14, 32-33.

A brief discussion is given of the difficulties in the pollination of the Delicious apple, due to the structure of the flower (cf. *Plant Breeding Abstracts*, Vol. XVI, Absts 901-2) and the observed preference of bees for the nectar of other varieties. The method of hand-pollination practised in the Wenatchee Valley, Washington, in order to overcome these difficulties, is described.

1888. 634.11:581.163:577.17(49.2)

Enquête betreffende de toepassing van bespuitingen met α -naphthalenazijnzuur met het doel den laten val te doen verminderen. (**Enquiry on the use of spraying with α -naphthalene acetic acid to reduce the amount of late drop.**)

Fruiteelt 1941 : 31 : 143-48.

ADEMA, J.

Groeistoffen en late val. (**Growth substances and late drop.**)

Ibid. 1941 : 31 : 177-82.

The first article is one of a long series on spraying with growth hormone to induce parthenocarpy and thus to prevent late drop. Successes have been recorded from various quarters and research is now being concentrated on the varietal aspect.

A questionnaire for growers has been drawn up and provision has been made to supply growth hormone through a Dutch firm, free to persons willing to record the results of tests on their trees, and thus to provide information as a basis for further research.

The second article records further progress in this investigation.

1889. LESLIE, W. R. 634.2:575(71.27)

Manitoba news letter.

N. and S. Dak. Hort. 1946 : 19 : 53, 59.

Selections of Nanking cherries (*Prunus tomentosa*) are to be further tested at the Morden Station. The ground cherry (*P. fruticosa*) has shown promising hardiness and productivity. Variability in several characters offers scope for selection. Since this species crosses readily with the commercial sour cherry it also offers scope for improvement by hybridization. Notes are given on the performance of sand cherry-plum hybrids and larger plum varieties.

1890. TUKEY, H. B. 634.22(73)

The Imperial Epineuse.

Amer. Fruit Gr. 1946 : 66 : No. 3 : p. 16.

An account is given of the old French plum variety, Imperial Epineuse. The variety matures late, and is one of the largest plums among those used for prune production; its quality is excellent.

1891. WELLINGTON, R. 634.22(73)

Promising plum varieties.

Amer. Fruit Gr. 1946 : 66 : No. 3 : 10-11, 26-29.

Promising plum varieties, bred or introduced in the north-eastern United States, are described.

1892. CHRISTOFF, A. 634.22-2.421.9-1.521.6(49.7)

(Contribution to the study of leaf spot on the plum).

Yearb. Agric. Exp. Stas, Bulgaria 1943 : 1 : 63-69.

The author disagrees with the findings of other investigators regarding the incidence of *Polystigma rubrum* on *Crataegus* and various species of *Prunus*. He therefore conducted experiments for some years in Bulgaria on the occurrence of the disease, and the reaction to it of different varieties of plums. On grouping the varieties according to a six-point scale ranging from immunity to severe spotting, it was clear that the varieties examined of *Prunus domestica* differed in susceptibility, and also those of *Prunus insititia*. Forms of *Prunus cerasifera* alone showed very high resistance and, in many cases, complete immunity.

1893. BLAKE, M. A. 634.25(74.9)

Brief plain facts about some peach varieties.

Hort. News, N.J. 1943 : 24 : 1532-33.

Brief notes are given on 45 varieties.

1894. FLORY, W. S. (jun.) 634.25:575(73)
Meeting the peach variety problem.

Virginia Fruit 1945 : 33 : 142-49.

Recently developed American peach varieties are discussed. An account of peach breeding work at the Virginia Agricultural Experiment Station is also included.

1895. BLAKE, M. A. 634.25:581.6(74.9)
Four new varieties of peaches show promise.

Hort. News, N.J. 1946 : 27 : 1788, 1791.

The new very early ripening varieties, N.J. 133, N.J. 134, N.J. 135 and N.J. 137, have shown promise as varieties suitable for freezing.

1896. BLAKE, M. A. 634.25-1.524:575.127.2(74.9)
A little known Chinese species of peach is being used in breeding work.

Hort. News, N.J. 1944 : 25 : 1576, 1586.

An account is given of the use of the Chinese bush peach, *Prunus kansuensis*, in breeding work at the New Jersey Agricultural Experiment Station. The flowers of this species are very hardy.

1897. BLAKE, M. A. 634.25-2.111-1.521.6(74.9)
Four new early varieties of peaches tested hardy.

Hort. News, N.J. 1946 : 27 : p. 1824.

The new unnamed varieties, N.J. 133, N.J. 134, N.J. 135, N.J. 137, have given promising results in tests for hardiness.

1898. BLAKE, M. A. and STEELMAN, C. H. (jun.) 634.25-2.111-1.521.6:575(74.9)
What is the cold resistance of fruit buds of peaches.

Hort. News, N.J. 1944 : 25 : 1577-78, 1588.

Investigations on the cold resistance of peach fruit buds are discussed; reference to different varieties and breeding for hardiness is included.

1899. BLAKE, M. A. 634.256-1.524:575(74.9)
A Russian nectarine proves promising for breeding.

Hort. News, N.J. 1945 : 26 : p. 1737.

An account is given of the Russian nectarine No. 0932, named Krasvynos, at the New Jersey Station.

1900. RUEHLE, G. D. 634.441:575(75.9)
The Kent and Zill mangos.

Pr. Bull. Fla Agric. Exp. Sta. 1945 : No. 614 : Pp. 4.

Descriptions are presented of the new varieties, Kent and Zill. Kent, a seedling of Brooks, has so far shown no scab infection, and both fruit and foliage have shown only moderate susceptibility to anthracnose. Zill, a seedling of the Haden mango, is slightly susceptible to scab, and only moderately susceptible to anthracnose. Both varieties give high yields of fruit with good commercial quality, and are recommended for commercial and home planting.

1901. MUSTARD, M. J. and LYNCH, S. J. 634.441:577.16(75.9)
Effect of various factors upon the ascorbic acid content of some Florida-grown mangos.

Bull. Fla Agric. Exp. Sta. 1945 : No. 406 : Pp. 12.

The ascorbic acid content of several mango varieties is given. The data indicate that good dessert quality and high ascorbic content are not necessarily associated.

1902. CAMP, A. F. and MOWRY, H. 634.451(75.9)
The cultivated persimmon in Florida.

Bull. Fla Agric. Ext. Serv. 1945 : No. 124 : Pp. 36.

Persimmon varieties are described.

1903. GUERREIRO, M. G. 634.53:582(46.9)
 Sôbre a caracterização das formas de castanheira "Longal" et "Judia" por meio
 da análise biométrica dos frutos e das folhas. (**The characterization of the**
Longal and Judia chestnuts by means of biometrical analysis of the
fruits and leaves).

Bol. Junta Nac. Frutas, Portugal 1945 : 5 : No. 12 : 3-11.

The synonymy existing in the Portuguese chestnuts and the lack of definition as to the characteristics of the named varieties complicate the breeding work which is now being started. The present study gives descriptions of the two chief varieties, Longal and Judia, first in general terms and then with statistical data relating to the length, breadth, weight and volume of the fruits and the length, breadth and dentation of the leaves.

1904. 634.53-2.421.9-1.521.6(73)

Blight resistant chestnuts.

Amer. Fruit Gr. 1946 : 66 : No. 4 : p. 35.

Several varieties of blight-resistant chestnuts are now available from growers.

1905. RYGG, G. L. 634.62:581.6(73)

Compositional changes in the date fruit during growth and ripening.

Tech. Bull. U.S. Dep. Agric. 1946 : No. 910 : Pp. 51.

The composition and quality of dates have been studied in relation to fruit development and ripening, and other factors. The material investigated consisted of the Deglet Noor and Barhce varieties.

1906. SLATE, G. L. 634.7:575(73)

Newer varieties of small fruits.

Amer. Fruit Gr. 1946 : 66 : No. 4 : 10-11, 32-33.

Strawberry and raspberry varieties recently developed in the United States and new Canadian varieties of raspberries are discussed.

1907. WILCOX, A. N. 634.7:575(73)

Breeding small fruits.

Amer. Fruit Gr. 1946 : 66 : No. 4 : 16, 39-40.

An account is given of small fruit breeding in North America and its problems.

1908. DRAIN, B. D. 634.71:575.127.2(76.8)

Tennessee Luscious red raspberry.

Circ. Tenn. Agric. Exp. Sta. 1945 : No. 92 : Pp. 4.

A description is given of the new red raspberry variety, Tennessee Luscious. It has been obtained from the cross Lloyd George x Tennessee seedling VVF169; the latter parent was selected from the cross Van Fleet x Viking. Tennessee Luscious produces large, firm and coherent berries of excellent quality.

1909. STAHL, J. L. 634.715:575.255(79.4)

Chimeras of Bowen blackberry. An unstable patented plant.

J. Hered. 1946 : 37 : 51-55.

Chimaeras produced by two plants of the Bowen thornless blackberry are described. Further study is to be devoted to their cytology and genetics.

1910. BANGA, O. 634.722:578.088:581.46

Het belang van de bloemkenmerken voor de identificering van roode bessen rassen. (**The significance of the flower characters for the identification of varieties of red currants**).

Fruitteelt 1942 : 32 : 187-94.

Concrete examples are used to explain the importance of the morphology of the flowers of varieties of red currants in identifying varieties and in determining racial purity. A diagnostic list evolved by Berger in 1924 is reproduced, and Thayer's classification is also mentioned, with a discussion and quotations of Bunyard's views on the subject.

1911. WILSON, G. B. 634.771:576.354.4:576.356.5
Cytological studies in the Musae. I. Meiosis in some triploid clones.
Genetics 1946 : 31 : 241-58.

Investigations on the meiosis of five triploid clones, viz. the Canary, Lacatan and Gros Michel bananas, and the White House and Maiden plantains, have been carried out with a view to studying variations within and between varieties and the relationship between meiosis and breeding behaviour.

The five triploid varieties fall into three groups, particularly with regard to meiotic pairing at metaphase I. The Canary banana showed reduced pairing of the three chromosome sets. The cytological observations on this variety suggest that it possesses two partially homologous chromosome sets, plus a third set with only two chromosomes with homologues in the first two; the variety may thus be symbolized as an approach to an A A B type. The Lacatan and Gros Michel bananas and the White House plantain appear to have two homologous chromosome sets and a third partially homologous set, which might be symbolized as A A A₁. The Maiden plantain tends to be strongly autotriploid, approaching an A A A type.

The cytological behaviour of the Gros Michel banana corresponds with its apparent complete sterility. The cytological behaviour of Gros Michel was also found to correspond with observed breeding behaviour; suppression of the first division of meiosis results in the production of triploid gametes which could combine with haploid gametes from the wild parent to produce tetraploid progeny, as indeed has been the general result in breeding work. The Lacatan banana and White House plantain resemble one another cytologically but whereas the former appears to be completely sterile, the latter seeds to a limited extent to produce diploid, triploid, tetraploid and aneuploid seedlings; the nature of this different breeding behaviour is not yet clear.

1912. POTAPOV, A. 634.835(47)
(Growing grapes in the province of Kharkov).

Socialističeskoe Zemledelie (Socialist Agriculture) 1945 : No. 180 : p. 2.

Although the first vineyards in the province were planted in 1665, grapes have not been grown there as a commercial crop until recently. The vineyards at the state and collective farms in the province before the war did not exceed an area of 88 ha. At one collective farm a record crop of 100 centners per ha. was harvested in 1944. For many years Michurin varieties have been successfully grown in the province. The varieties Russian Concord and Green Sweet produce high yields, and the latter ripens early at the end of August. A special committee selected 20 hybrid vines as most suitable for the province. It is intended to plant 100 ha. with table grapes within the next two years in the vicinity of Kharkov.

H. F.

1913. MOORE, R. C. 634.835:575(75.5)
The grape breeding program at V.P.I.

Virginia Fruit 1946 : 34 : No. 6 : 20-22.

Grape breeding work at the Virginia Agricultural Experiment Station is reviewed. Breeding objectives are (1) the development of late maturing types similar to the grapes transported from California in the late autumn and early winter; (2) testing grapes of this type for their local adaptability; and (3) testing the new varieties for their suitability as sources of juice and other products. Data are given on the various crosses effected.

1914. ANLIKER, J. and KOBEL, F. 634.835:577.17:581.165.71
Wuchsstoffversuche mit Rebveredlungen. (Experiments with growth substances on vine grafts).
Landw. Jb. Schweiz 1945 : 46 : 203-48.

The experiments indicated that it is possible that the varying success of hormone treatment is related to differences in the vine material. The stocks Berlandieri x Riparia 420A and Richter 31, types which take root badly, were both grafted with Blauburgunder; on treatment with the growth substance preparation, Roche 202, the increase in the number of successful grafts was only 2.7-3.0%, the control value being 0.5-3.5%. Other varietal combinations, e.g. Berlandieri x Riparia Teleki 5BB, grafted with Blauburgunder or Riesling x Sylvaner, and Riparia x Rupestris 3309, grafted with Blauburgunder or Elbling, gave, after the ordinary grafting process, 42-60% of successful grafts; after treatment with growth substance there was an increase of 11-26% in the number of first class young vines. These and other findings show that good

results from hormone treatment are obtained especially in those cases where the tendency to vegetative multiplication is already a property of the variety, and so even without hormones, a satisfactory number of successful grafts would result.

The authors also point out that within a variety great individual differences occur which affect grafting behaviour.

E. W.

1915. DEPARDON, L. and
BURON, P. 634.835:581.6:575.12
Les vins d'hybrides producteurs directs. (**The wines of direct producer hybrids**).
C.R. Acad. Agric. Fr. 1946 : 32 : 182-83.

Notes are given on the quality of the wines obtained from Seibel, Seyve-Villard and a few other direct producer vine hybrids.

FORESTRY 634.9

1916. RIGHTER, F. I. 634.9:575
New perspectives in forest tree breeding.
Science 1946 : 104 : 1-3.

It is pointed out that the principles of forest tree breeding can only be correctly appreciated when viewed in the light of sylvicultural methods. A genetically uniform stand of forest trees is not only unnecessary but undesirable. Moreover, since 90% of a stand may be removed in thinning, it is possible to interplant standard and new varieties of forest trees, thereby conducting varietal tests without wasting ground. Whichever variety eventually proves least satisfactory in such a mixed plantation can be eliminated during thinning before the stand reaches maturity. Furthermore, promising results may be obtained from F_1 interspecific hybrids which can be raised on a large scale without too great an expense. These can be tested by interplanting as mentioned above. It is possible that, since many forest tree hybrids are fertile, the F_1 types may be left to reproduce themselves; the heterogeneity of the F_2 offspring may constitute no drawback under sylvicultural conditions.

1917. 634.9:575:578.08
Plantforøddlingi Skovbruget. (**Plant breeding in forestry**).
Naturhistorisk Tidende, København 1940 : 4 : 115-20.

A report is given of a lecture on genetical and other methods in modern forestry technique.

1918. 634.972.1:576.356.5
JOHNSSON, H. 634.972.5:576.356.5
Chromosome numbers of twin plants of *Quercus robur* and *Fagus sylvatica*.
Hereditas, Lund 1946 : 32 : 469-72.

An examination of twin seedlings of *Q. Robur* and *F. sylvatica* has brought to light a triploid frequency of 0.4% and 0% respectively.

1919. WATERMAN, A. M. 634.972.3-2.482-1.521.6
Canker of hybrid poplar clones in the United States, caused by *Septoria musiva*.
Phytopathology 1946 : 36 : 148-56.

Hybrid poplar clones showed differences in relative susceptibility to *Septoria musiva*.

1920. GUERREIRO, M. G. and
FERNANDES, C. T. 634.972.4(46.9)
O castanheiro no distrito de Bragança. (**The chestnut in the district of Braganza**).
Bol. Junta Nac. Frutas, Portugal 1945 : 5 : Nos 7-8 : 5-32.

This account of *Castanea sativa* in the Portuguese district of Braganza includes a short reference to the varieties Enxerta, Aveleira, Buena Ventura and Rebordona.

1921. CASTRO, D. DE. 634.972.6:576.312.32
 Nota sôbre o número de cromosomas da "*Betula celtiberica*" Rothm. et Vasc.
 (*Note on the chromosome number of B. celtiberica Rothm. et Vasc.*).
Broteria 1944 : 13 : 73-74.

The number $n = 28$ has been confirmed for this species, which is therefore a tetraploid. No study of meiosis has yet been made but it is hoped to do so later. The chromosomes are extremely small, and hence the exact position of the constrictions is difficult to determine.

1922. LINDQUIST, B. 634.972.6:582
***Betula callosa* Notö, a neglected species in the Scandinavian subalpine forests.**
Svensk Bot. Tidskr. 1945 : 39 : 161-86.

The rediscovery of the species, *B. callosa* Notö, which occurs in the European Arctic and Western Siberia, is reported. The author classifies *B. callosa* and *B. Raddeana* together in a separate section named *Nivales*.

1923. BABCOCK, E. B. 634.975:576.12
The probable center of origin of the genus *Pinus*.
Amer. J. Bot. (Suppl.) 1946 : 33 : p. 233. (Abst.).

The genus *Pinus* is regarded as having arisen during the Mesozoic era, probably in north-eastern Asia or in the Arctic. The great diversification of the genus in Mexico is ascribed to late Tertiary times.

VEGETABLES 635

1924. ANDERSEN, E. M. *et al.* 635(75.9)
 Commercial vegetable varieties for Florida.
Bull. Fla Agric. Exp. Sta. 1944 : No. 405 : Pp. 30.

Notes are given on recommended and promising varieties of about 20 vegetables.

1925. McCRRORY, S. A. 635(78.3)
Varieties of fruit for South Dakota.
Circ. S. Dak. Agric. Exp. Sta. 1946 : No. 61 : Pp. 4.

Tree and small bush fruit varieties recommended for South Dakota are listed.

1926. BOSWELL, V. R. 635:575(73)
Disease-resistant and hardy varieties of vegetables.
Nat. Hort. Mag. 1946 : 25 : 158-64.

A brief account is given of disease resistant and hardy varieties of vegetable root crops, lettuce, spinach and pea.

1927. KÄMPFER, M. 635:581.6
 Entwicklung und gegenwärtiger Stand des Qualitätsbegriffs bei Gemüse.
 (*The development and present position of the concept of quality in vegetables*).
Landw. Jb. 1944 : 93 : 523-662.

A comprehensive discussion is devoted to elucidating the significance of the terms "vegetable," and of "commercial quality" and "biological value" as applied to vegetables. The various factors influencing the latter two qualities are considered, including references to the effect of genetical constitution and of polyploidy.

1928. MORRIS, H. J., WEAST, C. A. and LINEWEAVER, H. 635.13:577.15
Seasonal variation in the enzyme content of eleven varieties of carrots.
Bot. Gaz. 1946 : 107 : 362-72.

Details are presented on the catalase, peroxidase, ascorbic acid oxidase and phosphatase contents of eleven American carrot varieties.

1929. WILSON, J. D. 635.13-2-1.521.6(77.1)
Relative susceptibility of carrot varieties to nematode damage, yellows and defoliation by blights.
 Bi-m. Bull. Ohio Agric. Exp. Sta. 1946 : 31 : 35-39.
 Data are given on the relative susceptibility of 35 carrot varieties to nematode attack, yellows, and *Macrosporium* and *Cercospora* leaf blights.

1930. DAVIS, G. N. and 635.25:575(79.4)
 JONES, H. A.
"San Joaquin".
 Sth. Seedsman 1946 : 9 : No. 7 : p. 17.
 San Joaquin is a new onion variety specially adapted for cultivation in the south-western United States. It has been developed at the University of California by crossing a non-bolting, mild flavoured strain of Stockton Yellow Globe (Stockton G36) with Early Grano, and back-crossing to Early Grano. San Joaquin is an early maturing, non-bolting, high-yielding onion. Its keeping quality is poor. Disease resistance has not yet been transferred to the variety, but it shows some resistance to thrips.

1931. BINKLEY, A. M. and 635.25-2-1.521.6:575(78.8)
 SPARKS, W. C. 635.25:575.125
Station breeding onions for resistance to insects, purple blotch, and pink root.
 Colo. Fm Bull. 1944 : 6 : No. 2 : 8-11.
 Breeding for resistance to purple blotch and pink root in the Sweet Spanish onion and for thrips resistance in Mountain Danvers is in progress. F₁ hybrid production is also receiving attention, and male sterile lines of Sweet Spanish have been developed (cf. *Plant Breeding Abstracts*, Vol. XV, Abst. 766).

1932. JONES, H. A., 635.25-2.483-1.521.6:575.11.061.6
 WALKER, J. C.,
 LITTLE, T. M. and
 LARSON, R. H.
Relation of color-inhibiting factor to smudge resistance in onion.
 J. Agric. Res. 1946 : 72 : 259-64.
 The effect of different genotypes for bulb colour upon resistance to smudge [*Colletotrichum circinans* (Berk.) Vogl.] has been investigated in *Allium Cepa* L. White bulbs homozygous for the dominant factor *I* inhibiting pigmentation were found to be highly susceptible to smudge. Yellow or red bulbs which were homozygous recessives for the factor *i* were highly resistant. Cream bulbs of the genetic constitution *Ii* showed a resistance intermediate between that of the pure white and coloured bulbs.

1933. BRIERLEY, P. and 635.25-2.8-1.521.6(73)
 SMITH, F. F.
Reaction of onion varieties to yellow-dwarf virus and to three similar viruses isolated from shallot, garlic and narcissus.
 Phytopathology 1946 : 36 : 292-96.
 Varieties of *Allium Cepa* L. were inoculated with the onion yellow dwarf virus and virus isolates from garlic, shallot and *Narcissus Pseudo-Narcissus* L. Ten out of the 27 varieties tested exhibited immunity to the yellow dwarf virus and the isolates from garlic and narcissus, while the remainder were susceptible. With the exception of Nebuka (*A. fistulosum*) and the amphidiploid, Nebuka x White Portugal, all the varieties tested showed susceptibility to the shallot isolate; these two green bunching types were immune to all four viruses.

1934. BRIERLEY, P. and 635.25-2.8-1.521.6:631.84(73)
 STUART, N. W.
Influence of nitrogen nutrition on susceptibility of onions to yellow-dwarf virus.
 Phytopathology 1946 : 36 : 297-301.
 In a study of the varieties, Ebenezer, Utah Sweet Spanish, Creole and Stockton Yellow Globe, low nitrogen level of the soil was found to have a retarding or preventive effect upon yellow

dwarf virus infection. The resistance of Creole and Stockton Yellow Globe was distinct from the immunity of Utah Sweet Spanish. The problem of genetical uniformity for resistance in these two varieties is considered.

1935. TIMOFEEV, N. N. 635.34:575 "793":581.6(47)
 635.52:575 "793":581.6(47)

[The quality of the head and the length of the vegetative period in an assortment of head forming plants (cabbage, lettuce, etc.)]
 Moskovskaja ordena Lenina Seljskohozjaistvennaja Akademija imeni K. A. Timirjazeva. Doklady Vypusk III. Naučnaja Konferencija 4-11 Iyunja 1945 g. (Timirjazev Agric. Acad. Moscow Proc. No. III. Sci. Conf. 4-11 June 1945) 1946 : 69-73.

Experiments made with 75 cabbage and 43 lettuce hybrids from crosses between early and late varieties indicated that a relationship exists between the quality of the head and the length of the vegetative period. The head in very late varieties is always large, solid and white in colour on being cut; but the head in the very early varieties is mostly small, light and greenish. Growers have attempted in the past to breed early varieties of the above crops with large, solid and cream-white heads. Such attempts, however, were attended with many difficulties and were often unsuccessful. Examination of numerous hybrid cabbages and lettuces showed that the middle and lower portion of the stem contains large leaves, whereas the upper portion produces small leaves. These vary in number and size, according to the length of the vegetative period. If attention is given by breeders to the location, form and size of leaves, the production of early varieties with the desired quality of the head is considered possible. The investigations carried out to prove this point will be reported in a subsequent paper.

H. F.

1936. FOSTER, R. E. and WALKER, J. C. 635.34:577.16:575

Improvement of ascorbic acid content in yellows-resistant cabbage.
 Phytopathology 1946 : 36 : p. 398. (Abst.).

Cabbage varieties homozygous for the gene determining type A resistance to yellows were crossed with a line of Wisconsin All Seasons high in ascorbic acid content but possessing only type B resistance. F_1 and F_2 progenies were selected for type A resistance, high vitamin C content and desirable varietal type. Vitamin C content appeared to be controlled by multiple factors. Transgressive segregation towards increased vitamin C content was found in some of the F_2 progenies.

1937. POUND, G. S. 635.34-2.8-1.521.6(79.7)

Cabbage varietal reactions to mosaic viruses.
 Phytopathology 1946 : 36 : 408-09. (Abst.).

Several varieties are classified according to their reaction to the mosaic viruses.

1938. STEINER, E. 635.46:576.312.35:582:576.16

Cytogenetic studies on *Talinum* and *Portulaca*.
 Bot. Gaz. 1944 : 105 : 374-79.

The species of *Talinum* examined were found to fit into a polyploid series, ranging from $2n = 12$ to $2n = 72$. The species of *Portulaca* could not be classified into a regular polyploid series. The chromosomes of the various *Portulaca* species were also found to differ markedly in size, and in general were larger than those of *Talinum*. Attempts to cross *P. grandiflora* and *P. marginata*, *T. parviflorum* and *T. teretifolium*, and *T. aurantiacum* and *T. parviflorum* were unsuccessful. The taxonomy and possible evolution of the two genera are discussed in the light of these results.

1939. GARMAN, H. R. and BARTON, L. V. 635.52:581.04:581.142

The response of lettuce seeds to thiourea treatments as affected by variety and age.

Amer. J. Bot. (Suppl.) 1946 : 33 : p. 229. (Abst.).
 Lettuce varieties differ in the response of their seeds to the stimulatory effect of soaking in thiourea.

1940. BINKLEY, A. M. and
KREUTZER, W. A. 635.53-2.484-1.521.6:575(78.8)
Strain of Giant Pascal celery resistant to "yellows" in being developed at station.

Colo. Fm Bull. 1945 : 7 : No. 3 : 3-4.

The hybrid Giant Pascal No. 284, derived from a cross between tall and dwarf strains of Giant Pascal celery, shows promising resistance to *Fusarium* wilt. It also appears to be partially resistant to late blight.

1941. GYÖRFFY, B. 635.64:577.16
A paradicsom C-vitamin tartalmáról. (**Ascorbic acid content of tomatoes**).
Arb. Ung. Biol. Forsch-Inst. 1943 : 15 : 441-49.

The distribution of vitamin C in different tomato varieties was investigated. Values are given for the various parts of the fruit. It was found that the vitamin content was not constant within a variety. Some correlation exists between fruit size and vitamin C content; it is, therefore, suggested that vitamin C content is only indirectly controlled by genes. E. E.

1942. RICK, C. M. 635.64:581.162.5
The development of sterile ovules in *Lycopersicon esculentum* Mill.
Amer. J. Bot. 1946 : 33 : 250-56.

Two types of female sterility in the tomato are described. In the first type, development is normal until megasporogenesis but degeneration occurs thereafter. In the second, a megaspore mother cell is not formed, the nucellus remaining undifferentiated. The possible causes of these anomalies are considered.

1943. RICHARDS, M. C. and
BARRATT, R. W. 635.64-2.411.4-1.521.6
A partial survey of the genus *Lycopersicon* for resistance to *Phytophthora infestans*.

Plant Dis. Reporter 1946 : 30 : 16-20. (Mimeographed).

A report is given of tests of the following *Lycopersicon* species to *Phytophthora infestans*: common and rare types of *L. esculentum*, and selections of *L. pimpinellifolium*, *L. hirsutum*, *L. hirsutum* var. *glabratum*, *L. hirsutum* var. *cerasiforme*, *L. peruvianum*, *L. peruvianum* var. *humifusum* and *L. chilense*. All the 137 selections tested proved to be highly susceptible to the disease.

1944. SNYDER, W. C.,
BAKER, K. F. and
HANSEN, H. N. 635.64-2.484-1.521.6
Interpretation of resistance to *Fusarium* wilt in tomato.
Science 1946 : 103 : 707-08.

Experiments are reported to show that the resistance of the tomato variety Pan America to *F. oxysporum* f. *Lycopersici* resides in the cellular protoplasm. It is not localized in the root and it does not operate in the lumen of the xylem vessels.

1945. STROMAN, G. N. 635.652:575.061.634
Albinos in pinto beans.
J. Hered. 1946 : 37 : 59-60.

An albino form of pinto bean producing three to five white leaves before dying is reported. From the segregation data of two families the albino character can be explained as being due to a single recessive. Several progenies, however, showed considerable variation from the 3:1 ratio, and a deficiency of pure green plants was observed. The possibility of a modifying factor is to be further investigated.

1946. LEBEDEFF, G. A. 635.652.581.142(72.95)
Heredity and environment in the production of hard seeds in common beans (*Phaseolus vulgaris*).
Res. Bull. P.R. Agric. Exp. Sta. 1943 : No. 4 : Pp. 27.

Experiments were carried out on the production of hard seeds in 36 common white bean selections whose seeds were dried at different moisture contents and then subjected to germination and

soaking tests. Data were obtained indicating that differences among individual selections in hard seed production are hereditary.

1947. HASKELL, R. J. 635.652-2.112-1.521.6:575.12(73)

All-Southern snap bean.

Sth. Seedsman 1946 : 9 : No. 6 : 16, 64, 67.

The results of extensive trials of the Logan stringless snap bean are summarized (cf. *Plant Breeding Abstracts*, Vol. XIII, Abst. 1417).

1948. PRYOR, D. E. and WEBSTER, R. E. 635.653-2.8-1.521.6(75.2)

Relative resistance and susceptibility of U.S. 243 and U.S. 343 lima beans to lima-bean mosaic.

Phytopathology 1946 : 36 : 170-72.

At Beltsville, Maryland, it has been observed that the Lima bean variety, U.S. 243, is resistant to mosaic, while U.S. 343 is susceptible. Both lines are selections of the same Fordhook x Sieva cross.

1949. TING, C. L. 635.655:575.11:575.127.2(51)

Genetic studies on the wild and cultivated soybeans.

J. Amer. Soc. Agron. 1946 : 38 : 381-93.

The mode of inheritance of several characters was studied in hybrids between *Glycine ussuriensis* Regel and Mack and *G. Max* (L.) Merrill.

The fertility of the F₁ plants and their progenies was normal, indicating a close phylogenetic relationship between the two species.

Among the 15 characters studied, 14 characters of the wild type show complete or partial dominance to the corresponding characters of the cultivated type, only the appressed pubescence of the cultivated species being dominant. The mode of inheritance of the colour of the stem, flower, pod, testa, hilum and pubescence, the pod-bearing habit, bloom on the testa, and appressed pubescence were found to be the same as in the intervarietal crosses made by previous investigators.

Sharp-tipped pubescence was found to be dominant to blunt-tipped and to depend upon a single gene difference.

The hardness of testa of the wild soya bean also depends upon a single gene. The factor pair determining the degree of hardness of the testa has been designated *H h*.

Plant height and seed size and shape were found to be quantitative in inheritance.

Linkage is reported between grey pubescence and soft testa and between yellow pod and determinate growth.

1950. VIK, K. 635.656.00.14(48.1)

Forsøk med erter og blandinger av erter og korn. (**Experiments with peas and mixtures of peas and oats.**)

Meld. Norg. LandbrHøgsk. 1946 : 26 : 1-62.

Pea variety trials from 1921 to 1944 are recorded. Torsdag II gave the highest seed yield. Only slightly inferior were two Norwegian varieties, the green seeded Ringeriks and the yellow seeded Onsrud.

The Norsk Gråert (Norwegian Grey pea) belonging to the species *Pisum arvense*, suited the poorer soils but could not compete with the yellow or green types under good conditions.

Observations on wilt resistance were recorded during the period under review.

1951. CYRUS, W. F. 635.656.00.14(73)

Dixie Wonder.

Sth. Seedsman 1946 : 9 : No. 6 : 18, 44, 48.

An account is given of the performance in recent trials of the Dixie Wonder field pea (cf. *Plant Breeding Abstracts*, Vol. XVI, Abst. 491).

1952. THOMAS, P. T. and
 REVELL, S. H. 635.657:576.354.46
Secondary association and heterochromatic attraction. I. *Cicer arietinum*.
Ann. Bot. 1946 : 10 : 159-64.

Both normal and gigas forms of *C. arietinum* have $2n = 16$ chromosomes. In the diploid condition, primary chromosome pairing is followed by indiscriminate secondary pairing of the bivalents. In colchicine-induced tetraploids, secondary pairing also occurs, but in this case mainly between homologous bivalents.

1953. HARPER, R. E. 635.67:575(72.95)
USDA-34—a tropical sweet corn.
Agric. Amer. 1946 : 6 : 74-75.

Work conducted at the Federal Experiment Station at Mayaguez, Puerto Rico, to breed a sweet corn variety adapted to tropical conditions is described. An account is given of the variety USDA-34, derived from a native strain and distributed to growers in 1934.

1954. MONTELARO, J. 635.67:575(76.3)
Corn fit for the gods!

Sth. Seedsman 1946 : 9 : No. 5 : p. 14.

The new sweet corn, Louisiana Bayou, is described. It is medium early in maturity, and produces two to three good ears per stalk. The shuck is tighter and more compact than in other varieties, providing protection from insect and bird attack.

1955. SINGLETON, W. R. 635.67:575.061.1
Inheritance of indeterminate growth in maize.

J. Hered. 1946 : 37 : 61-64.

A character for indeterminate growth habit which behaves as a single recessive is reported in the sweet corn inbred C31.

1956. ELDREDGE, J. C. and 635.677(77.7)
 LYERLY, P. J.
Popcorn in Iowa.

Bull. Ia Agric. Exp. Sta. 1943 : No. P54 : 753-78.

Notes are included on nine varieties.

BOOK REVIEWS

CUSSET, F.

030.8.5

English-French and French-English technical dictionary.

Chemical Publishing Company, Inc., Brooklyn, N.Y. 1946 : \$5.00. Pp. 590.

English and French scientists and technical workers in the fields of mineralogy, metallurgy, electricity, chemistry, engineering and mechanics will find this compact American dictionary of value in their study of foreign literature, text books, etc., dealing with their particular field of pure or applied science. In spite of the fact that this volume has been compiled by a single author in his leisure hours as a mining engineer at Valleroy in France, the field appears to have been well covered and the number of terms included is very large. Also, convenient tables for conversion of English and French measures have been included.

The English section contains numerous American words, but the English reader will probably have little difficulty in converting them into the corresponding jargon current in this country. The book should prove a useful addition to public or commercial technical libraries for the use of students, translators, librarians, and commercial travellers with a good working knowledge of French or English. Nevertheless, some pitfalls for the unwary French or English user will be found under "backwardation", "airport", "extincteur chimique" (translated "portable chemical-fire engine" instead of "fire extinguisher"), "to journalize" given as the translation of "journalizer", "spark plug"; and "altérer" given only as "to alter" which is its least common meaning. The printing is good, and an attractive and useful contrast between heavy and light fount assists the eye.

SIMPSON, G. G.

576.12

Tempo and mode in evolution.

Columbia University Press, N.Y., 1944 : \$3.50. Pp. xviii + 237. 36 figs.
19 tables.

It would be interesting to discover how far the present widespread acceptance of neo-Darwinism is due to the expository brilliance of its protagonists, in particular to Morgan, J. B. S. Haldane, Huxley, Dobzhansky, Waddington and Mayr. No scientific theory in recent years has had the services of such a devoted following, and even a cursory reading of Dr Simpson's book is enough to show that here is another addition to the imposing series of neo-Darwinian classics.

In contrast to preceding writers, Dr Simpson brings to his aid a profound knowledge of palaeozoology, a study that geneticists have tended to regard askance as a perennial source of neo-Lamarckian speculation. Such distrust Dr Simpson has probably allayed once and for all. The author's principal aim has been to show the thorough-going concordance between palaeontology and neo-Darwinian evolutionary theory, and he has performed this task with a high degree of success.

The principal difficulty in harmonizing the data of palaeontology and neo-Darwinian genetics has always been the fact that the fossil record does not show that uniform, gradually differentiating genealogical progression that many evolutionists would have expected. Moreover, there are significant gaps between most of the higher systematic categories. Dr Simpson deals thoroughly with these topics, and puts the whole discussion on a more precise plane by his analysis of evolution with regard to rate. He recognizes three main categories of evolution from this point of view: horotely, evolution proceeding at standard rate; bradytely, the extremely slow evolution of such well-known forms as *Lingula*; and tachytely, abnormally fast evolution. Such are the categories of evolution from the point of view of *tempo*. Three *modes* of evolution are likewise recognized: speciation, the splitting of an ancestral population into two or more divergent groups; phyletic evolution, the change during time of a whole single genetic population; and quantum evolution, the process that gives rise to new systematic groups. Each of the evolutionary categories thus recognized are discussed by the author in the light of neo-Darwinian theory, and he concludes that no evolutionary category is inexplicable according to the principles of this theory. Goldschmidt's distinction between micro-evolution and macro-evolution is believed to be unreal, and it is shown that there are better grounds for distinguishing between

both of Goldschmidt's categories and mega-evolution, the process whereby the major taxonomic classes are differentiated.

In his discussion of the causes of bradytely, the author suggests that bradytelic forms may remain such through an unusually high degree of adaptation to their environment. Furthermore, and less satisfactorily, it is thought probable that bradytelic species exist in large populations even though such a famous example as *Latimeria* is only known from a single individual. It is admittedly difficult to account for bradytely along standard neo-Darwinian lines unless large populations are involved, but the evidence for this assumption is not satisfactory.

Difficulties also occur on the topic of orthogenesis or evolutionary momentum. In common with other neo-Darwinists, Dr Simpson attempts to explain all the cases quoted in terms of the direct or indirect operation of natural selection. Such explanations commend themselves on the grounds of theoretical simplicity, yet it must be recognized that the evidence in their favour is only slight. On the other hand, it is almost impossible, by experimental methods, to rule out the possibility of such an operation. The whole situation is parallel to the polygene controversy; the neo-Darwinian theory of evolutionary momentum and the explanation of blending inheritance in terms of polygene interaction both cover the facts, but would do so even though the theories were erroneous. That is to say, at the present moment these two theories both lack an adequate means of verification and an adequate means of possible rebuttal.

A third controversial matter in which the author makes a valuable contribution is the question of the origin of the higher systematic groups. There has been a tendency on the part of geneticists to minimize the importance of the fact that practically every large class of organisms has arisen suddenly in the fossil record with no intermediate forms linking it to its putative ancestor. Dr Simpson does well to emphasize the significance and regularity of these gaps, and he concludes that a particular mode of evolution, quantum evolution, must be invoked to cover these occurrences, though it is held that this evolutionary mode still falls within the field of neo-Darwinian theory.

It is impossible, in a short review, to do justice to the closely knit reasoning that the author has put into this extremely valuable work. Dr Simpson has certainly performed a most signal service to neo-Darwinism in elucidating what has been one of its weaker sides, the interpretation of the details of the fossil record. It is, of course, evident that there is still much research to be done before many tenets of the neo-Darwinian position can hold more than a speculative value. The role of natural selection is still more a matter of opinion than experiment; the causes of bradytely, quantum evolution, and the nature of evolutionary momentum and evolution towards extinction still remain obscure in spite of Dr Simpson's clarification; and it is becoming increasingly obvious that the notion of random mutation is merely camouflaging the least satisfactory side of the neo-Darwinian theory.

The present volume will probably become the standard exposition of neo-Darwinism from the palaeontological angle.

TÄCKHOLM, V.
TÄCKHOLM, G. and
DRAR, M.

581.9(62)

Flora of Egypt. Vol. I. Pteridophyta, Gymnospermae and Angiospermae, part Monocotyledones: Typhaceae-Gramineae.
Bull. Fac. Sci. Fouad Univ., Cairo 1941 : No. 17 : Pp. 574.

In several respects the flora of Egypt is of particular interest. Not only is the wild vegetation rich and varied, comprising a flourishing desert flora in February and March, a Mediterranean flora, an Irano-Turanian flora on the Sinai mountains, and the Nubian flora of the Elba mountains in the south, but the crops and cultivated trees, medicinal plants, and unique tomb flora each arouse interest. The first volume of this flora of Egypt, which is based upon Boissier's *Flora Orientalis*, deals with the Pteridophyta, Gymnospermae, and Typhaceae and Gramineae. Judging by this first volume, the flora promises to be a work of excellence, undertaken in the spirit of the highest tradition of flora compilation, and in addition to its intrinsic botanical merit, the work forms a valuable source of information on the history and economic uses of the chief crops and miscellaneous plants, not likely to be found elsewhere in so concise a form, as for instance in the sections on wheat, barley and *Sorghum*. The inclusion of Arabic plant names also adds to the value of the flora.

SAINT-HILAIRE, A. DE 581.9:582(81)
Esquisse de mes voyages au Brésil et Paraguay. (Sketch of my travels in Brazil and Paraguay).
Chronica Botanica 1946 : 10 : 1-61. Published by Chronica Botanica Co., Waltham, Mass. (price \$2.00).

Auguste de Saint-Hilaire was one of the foremost representatives of two of the most important trends in the development of botany during the first half of the nineteenth century. On the one hand, he was one of the most lucid exponents of the theory of metamorphosis of plant organs, which Goethe had introduced to German botanists, and which de Candolle, Duperreux, Turpin and Dunal had popularized in France. On the other hand, he was one of the most capable botanical explorers who were combing the earth for new species, now that Linnaeus had at last reduced taxonomy to a precise art.

The *Esquisse* represents the latter side of Saint-Hilaire's activities, presenting in a brief outline the course of his plant-collecting travels in South America, and including also notes on the customs of the inhabitants after the manner of the time. It constitutes the introductory chapter to Saint-Hilaire's *Histoire des plantes les plus remarquables du Brésil*, and is a recension of the *Aperçu d'un voyage dans l'intérieur du Brésil* read before the Académie des Sciences and published in the *Mémoires du Muséum d'Histoire Naturelle de Paris* in 1822.

The reprint of the *Esquisse* under review contains the complete text in the original French, and is prefaced by an introductory essay by Dr A. E. Jenkins on the life of Saint-Hilaire and his significance in botanical history.

There can be no doubt that Saint-Hilaire's record of his travels is an interesting item in the history of plant exploration. It is rather more doubtful whether it is of sufficient interest to merit reprinting.

WOOD, R. C. 63
A note-book of tropical agriculture.
 Imperial College of Tropical Agriculture, Trinidad 1945 : 3rd Ed. Pp. 147.
 tables. illus.

First published in 1933, this volume is a collection of practical facts and figures likely to be of assistance to those engaged in the various branches of tropical agriculture. Sections deal with weights and measurements, mensuration and surveying, buildings and roads, machinery, labour, soils, manures, crops, foods and feeding, livestock, dairying, recipes for insecticides and fungicides, statistics, and the Imperial Agricultural Institutes and Bureaux. The book is a useful source of miscellaneous information of a simple everyday nature. The third edition contains a few minor alterations.

HUTCHISON, C. B. (Editor) 63(79.4)
California agriculture.
 University of California Press, California 1946 : \$5.00. Pp. viii + 444. figs.
 tables. pls.

In no comparable area is such a diversity of climatic conditions to be found as in California; the rapid agricultural development of the State has also been unique, passing within the last hundred years through periods in which cattle ranching, sheep farming and wheat production were in turn the main farming activity, to be finally superseded by the diverse and highly specialized agriculture of present-day California. The intense development of agriculture in California is an outstanding example of the application of science to crop and animal production. Only eighteen years after the cession of the country to the United States, the University of California was founded, and the legislature of 1868 stipulated that the College of Agriculture should be the first established college; the State therefore had the advantage of close collaboration between research and agricultural practice at a comparatively early date. This book on various aspects of agriculture in California has been compiled by members of the faculty of the College of Agriculture, in commemoration of the seventy-fifth anniversary of the founding of the university, and it is worthy of an inspiring subject. An account is given of the historical background of Californian agriculture, and its economic and social structure, and of the soils, irrigation, crops, livestock, and plant protection, and the research work achieved in the various fields, including plant breeding. A vivid picture emerges of the rich complex development of agriculture, and

the particular economic problems in California, such as the casual labour supply, are objectively treated. The book as a whole is a notable contribution to the history of the agriculture of the United States, and a fitting tribute to the energy and intelligence of the pioneer farmer and scientist.

PARRY, J. W.

633

The spice handbook. Spices, aromatic seeds and herbs.Chemical Publishing Co., Inc., Brooklyn, N.Y. 1945 : \$6.50. Pp. xvii + 254.
photos. tables.

This book has been compiled primarily for those engaged in the various branches of the spice and herb trade, and it provides a valuable handbook of miscellaneous information. Sections are devoted to the various spices, aromatic seeds, and herbs. Spice formulae, the regulations of the American Spice Trade Association, and extracts from the pure food laws of the United States and Canada are also given. Photographs and photomicrographs made by the author are included to facilitate the identification of the various commodities. Some criticism must be directed at the grouping of the spices. For a book of this purpose the broad classification of the commodities under the trade groups of spices, aromatic seeds, and herbs is appropriate, but certain confusions are to be noted. The chapters on sesame and star anise occur in the part dealing with the herbs. These should be placed among the aromatic seeds, as indeed appears to have been the author's intention according to the introduction; similarly the familiar herb, sweet basil, is out of place in a chapter concerned with miscellaneous roots, herbs, barks and other products. In addition, capers and tarragon would surely have been better included in the main sections on spices and herbs, respectively. Apart from these minor faults, whatever their origin, the book is a useful source of reference for both the specialist and the general reader.

JASNY, N.

633.11:576.16:9

The wheats of classical antiquity.Johns Hopkins Press, Baltimore 1944: \$1.75. Pp. 176. 2 pls. tables
(Johns Hopkins Univ. Studies Hist. Political Sci. Ser. 62. No. 3).

The tendency for research to confine itself to well-worked fields of knowledge has resulted in the development of numerous discrete spheres of knowledge between whose boundaries there lie regions of study only cursorily treated. Such a no man's land is constituted by the botanical passages of classical Latin and Greek literature, though these are of considerable importance for determining the history of cultivated crop plants. Generally speaking, and excepting a small number of distinguished scholars, classicists have had insufficient botanical knowledge to interpret the botanical sections of their texts, while botanists have lacked the necessary classical background. The book under review however has made a most useful contribution towards closing this gap, and presents a valuable account of the wheat crops grown in the Mediterranean region in classical times.

The author's method of approach has been to assemble the archaeological evidence relating to wheat cultivation, and to integrate this with present-day knowledge of the distribution of wheat species, both as cultivated crops and as weed relics. The latter aspect is treated along the lines suggested by Vavilov and Flaksberger. Having then collected together the direct evidence bearing on wheat cultivation in the classical era, the author examines the texts dealing with wheat, in particular the writings of Theophrastus, Galen, Dioscorides, Pliny and Columella. This study is rendered especially difficult by the shifting meaning that has attached to many of the names given to classical wheat varieties, a confusion that has been manifest in several of the translations published of classical botanical writings. The author has performed a valuable service in reducing this confusion, although it might be thought that he has possibly over-simplified some of the knottier nomenclatural problems. His conclusions may be summarized as follows.

Triticum monococcum was known as *τίφη* and appears to have been cultivated over a wide area in classical times. It was of considerable importance north of the Alps, but in the Mediterranean region it appears to have been grown but sparsely and on poor soils.

Of far more importance were the 28-chromosome wheats of the emmer group; in fact, in the author's opinion, *T. dicoccum* was probably the most widely grown wheat in early classical times, though the shift from hulled to naked wheat appears to have taken place during the classical period. The two Greek terms, *ζεύς* and *ὅλυρος*, both refer to *T. dicoccum*, as do the Latin names

far and *adoreum*. It should be noted, however, that *far* was apparently used in early times for cereals in general. *T. dicoccum* appears to have been grown extensively in most of the Mediterranean countries.

The naked 28-chromosome wheats were also extremely important and tended to replace *T. dicoccum* in later classical times. It is hardly possible to distinguish between *T. durum* and *T. turgidum* in the literature, although there is evidence that these two species could be differentiated in those times. The naked 28-chromosome wheats were known as *σεμιδαλίτης* in Greek and *triticum* in Latin, though the latter term was also used for naked wheats in general or even for any form of wheat. *T. durum*, and to a lesser extent *T. turgidum*, appear to have been grown throughout the Mediterranean region, especially in warmer and drier localities.

T. vulgare and the closely allied *T. compactum* were also grown in classical times in the Mediterranean zones although not so extensively as the 28-chromosome species. They were confined mainly to wetter and less hot regions than the tetraploid forms. The Greek wheat *σιταρίας* and the Latin wheat *siligo* appear to have belonged to these two hexaploid species.

Other classical expressions referring to wheat are *πυρός*, which is used in most cases for any naked wheat, *σῖτος*, a later term for naked wheats, and *frumentum*, the standard Latin expression in the later classical period for naked wheat. It is important to notice that, in the author's opinion, spelt (*T. Spelta*) was practically unknown in the Mediterranean region, being of importance only in southern Germany and Switzerland, as at the present day.

The work of Vavilov showed how much plant breeding can profit from a knowledge of the historical development of crop plants. This book is a useful contribution to this end, as well as forming a welcome addition to the literature on classical botany.

MANGELSDORF, P. C.

633.15:581.46:576.16

The origin and nature of the ear of maize.

Bot. Mus. Leafl. Harv. 1945 : 12 : 33-75. plates.

The problems surrounding the morphology and evolutionary history of maize have provided ample material for research for many years past, and yet it would be no exaggeration to say that there still appear to be as many unexplained questions, or possibly more, than at the beginning of the investigation. This is not to deny however that noteworthy progress has been made towards elucidating these problems, especially by such authors as Collins, Langham, Reeves, Weatherwax and the author of the contribution under review. But scientific progress consists so often in the elimination of false hypotheses rather than in a positive advance towards the truth, that the present uncertainty regarding so many questions connected with maize is no cause for dejection.

In the present article, Dr Mangelsdorf contributes yet further evidence towards his theory that maize may be resolved into two components, an ancestral "pure" type characteristic of the Andes and the adjacent South American lowlands, and a *Tripsacum*-contaminated maize located in North and Central America and in most of the lowlands of South America. He reports the results of an investigation made of a hybrid between pod corn and a maize variety grown by the Guarani Indians of Paraguay. The distal region of the ears of this hybrid showed a tendency towards lax and indefinite growth, the spikelets being born in whorls unrelated to the kernel rows evident in the lower part of the ear. The development of longitudinal rows of kernels is therefore regarded as a secondary effect of compacting.

With this piece of evidence in mind, the author rejects the various fusion hypotheses of the origin of the maize ear, and interprets the ear as a compacted spike homologous with the central spike of the tassel. In contrast to the postulated "pure" maize types, the author, as mentioned above, recognizes a category of *Tripsacum*-contaminated maize, which is thought to include the maize varieties commonly grown in North America. It is noteworthy that teosinte-maize hybrids have more strongly indurated cobs according to the amount of *Tripsacum* germplasm present, and a positive correlation also exists between the amount of *Tripsacum* germplasm and spiral phyllotaxy in the tassel. It is therefore suggested that, while "pure" maize is characterized by whorled inflorescence phyllotaxy, weakly indurated cobs and a random arrangement of sessile and pedicellate spikelets in the tassel, the *Tripsacum* contaminants are distinguished by spiral inflorescence phyllotaxy, markedly indurated cobs and a regularly disposed pattern of sessile and pedicellate spikelets in the tassel, a character suggestive of teosinte ancestry.

It is not possible to do justice in a review to the whole weight of argument brought forward by the author in support of his theory, much of which has already been published in earlier papers.

In such a complex problem it is difficult to arrive at conviction, and although the author's views are plausible, it is too early yet to pass beyond the stage of working hypotheses, especially as so many of the Central and South American maize varieties have yet to be studied. None the less, the author's balanced presentation of his own and rival theories, his clear exposition of the problems at issue, and his excellent supporting photographs, combine to produce a model presentation of a carefully worked out morphological theory.

LEGGETT, W. F.

633.86:9

Ancient and medieval dyes.

Chemical Publishing Co., Inc., Brooklyn, N.Y. 1944 : \$2.25. Pp. vi + 95.

A popular account is given of the use of the various vegetable dyes, and the few animal and mineral dyes, in ancient and medieval times. The book contains much interesting historical information, but unfortunately it is not well-written. The style is slip-shod, a wrong mixture of tenses being particularly disturbing on occasion; certain inaccuracies are to be found, for instance, it is a surprise to encounter *Crocus sativus* referred to as a shrub; and some of the generalizations are dubious. But although the book cannot be described as an authoritative or well-written introduction to the subject, it should prove useful to both the manufacturer and the general reader, and certainly stimulate further interest in the many-sided history of the uses of the dyes. A short bibliography is appended; further details beyond merely the titles and authors' names without initials would have perhaps rendered the bibliography a more convenient source of reference.

DUBOIS, J.

634.835:581.6(49.4)

Le vigneron vaudois et ses vins. (**The vine-grower of Vaud and his wines**).

Imprimerie Centrale S.A., Lausanne 1944 : Pp. 261. 4 tables. plates.

The vine constitutes one of the major crop plants of the Swiss canton of Vaud, and upon its profitable management depends the standard of living of many of the inhabitants. In the extremely useful account prepared by M. Dubois of the state of this industry, the imperative necessity is emphasized of development along lines in which the results of scientific research are utilized in conjunction with sound economic principles.

In order that the vine-growers of Vaud should secure the greatest reward for their labours, it is essential that they should grow vines, well-adapted to local soils and local climatic conditions, should use cultural methods calculated to produce maximum yields, and, in particular, should do all they can to improve the quality of the resultant wines. The author makes it clear that, although the wine industry can be fostered by governmental control, price regulation, tariffs, etc., it is powerless to alter the palates of the local consumers. The inferiority of much of the wine produced in Vaud is attributed to the use of wrong varieties, and in this connexion M. Dubois is at pains to point out the defects in quality shown by the prolifically bearing direct producer hybrids. In his opinion, the *Vitis Labrusca* ancestry of these forms militates inevitably against their acceptance into the rank of premier quality vines.

As an alternative, it is suggested that such red wine producers as Pinot Noir, and white wine producers like Sylvaner Vert and Aligoté, should be carefully selected and grown on the best available stocks. Hybridization between local varieties is also recommended.

It is possible that M. Dubois has rather underrated the breeding possibilities of American-European vine hybrids. Nevertheless, his plea for making the best use of local material should not fall on unresponsive ears. His book can be confidently recommended to all those interested in the improvement of Swiss vines.

THOMPSON, H. C.

635.31(73)

Asparagus production.

Orange Judd Publishing Co., Inc., N.Y. 1946 : \$1.50. Pp. 124. 12 figs. 4 tables.

The results of experiments on the various aspects of asparagus growing conducted by the State agricultural experiment stations of the United States and by the U.S. Department of Agriculture, and the findings of practical growers' experience have been brought together in a simply written book for the assistance of market and home garden producers of the crop. Diseases and insects, and varieties and improvement are among the subjects considered. A useful bibliography of 50 references is appended. The book provides an authoritative, up-to-date guide to asparagus production; it can be thoroughly recommended.

NEW JOURNALS

Experientia, Basel

The object of this new journal is to provide information on current scientific research in many fields by means of comprehensive original articles by authors in various countries; by the publication of brief preliminary communications; and by book reviews and reports on congresses and meetings.

The range of subjects covered by the first volume includes articles dealing with physiology, botany, cytology, irradiation and X-ray technique, biochemistry, veterinary science, mycology, geology, astronomy, mathematics and statistics.

The main languages used are German, French, English and Italian.

The journal is well produced and the illustrations and figures well executed.

Genetica Agraria, Roma

The new journal *Genetica Agraria* has been instituted as a companion to *Scientia Genetica*, dealing however with topics of more immediate practical interest. The first number includes papers on the castor-oil plant, dormancy in wheat, the pigmentation of wheat grain, vernalization of the potato, branched inflorescences in wheat, maize varieties, resistance of wheat to rust, and the organization of genetic research concerned with crop plants. General notes of interest to plant breeders conclude the number.

The articles are written in Italian and are summarized in Latin and English.

INDEX

Abbe, L. B., 1868
 Abbott, E. V., 1815
 Adema, J., 1888
 Afzal, M., 1530
 Aitken, T. R., 1500
 Åkerberg, E., 1728
 Åkerman, Å., 1583, 1718
 Andersen, E. M. *et al.*, 1924
 Anderson, E., 1736
 Anderson, J. A., 1500
 Andersson, G., 1695
 Anliker, J., 1914
 Anonymous, 1468, 1470–4, 1486,
 1493–4, 1497–8, 1508, 1518–20,
 1526–7, 1533, 1536, 1542–3,
 1555, 1557–8, 1572, 1577–82,
 1585–602, 1680, 1693–4, 1697,
 1704, 1766–8, 1772, 1780, 1787,
 1804, 1811, 1824, 1826, 1862,
 1873–5, 1878–80, 1888, 1904, 1917
 [Anson, R. R.], 1525
 Arceneaux, G., 1817, 1820
 [Argles, G. K.], 1880
 Arnold, P. D. Dix, see Dix Arnold,
 P. D.
 Asmous, V. C., 1608
 Atchison, E., 1649
 Aufhammer, G., 1717
 Ausemus, E. R., 1703
 Babcock, E. B., 1923
 Bachtayev, F. Kh., 1748
 Bahtayev, F. H., see Bachtayev,
 F. Kh.
 Baker, J. R., 1481
 Baker, K. F., 1944
 Bakshi, V. M., 1492
 Baldwin, J. T. (jun.), 1866
 Banfield, W. G., 1770
 Banga, O., 1910
 Bannan, M. W., 1552
 Barducci, T., Boza, see Boza
 Barducci, T.
 Barnard, C., 1549
 Barratt, R. W., 1943
 Barton, L. V., 1939
 Bateman, A. J., 1488
 Bawden, F. C., 1524
 Beadle, G. W., 1641
 Becker, R. B., 1784
 Belgovskaya, A. A. Prokofieva-, see
 Prokofieva-Belgovskaya, A. A.
 Bergamin, J., 1855
 Billeaud, G. L., 1812
 Binkley, A. M., 1931, 1940
 Blagovščenskii, A. V., 1669
 Blagoveshchenski, A. V., see Bla-
 gošečenskii, A. V.
 Blair, D. S., 1559
 Blake, M. A., 1893, 1895–9
 Boekholt, K., 1604
 Boivin, A., 1628, 1672
 Bonvicini, M., 1576
 Borlaug, N. E., 1744, 1809
 Boswell, V. R., 1926
 Bougy, E., 1833, 1840
 Boyce, S. W., 1475, 1479
 Boza Barducci, T., 1603
 Brachet, J., 1645
 Brandes, E. W., 1812
 Brett, P. G. C., 1540
 Brierley, P., 1933–4
 Brink, R. A., 1738
 Brunson, A. M., 1745
 Buhrer, E. M., 1797
 Buron, P., 1915
 Caldwell, R. M., 1716
 Câmara, A., 1708
 [Cameron, G. S.], 1525
 Camp, A. F., 1902
 Camp, W. H., 1865
 Campbell, J. A., 1515
 Carlson, J. W., 1777
 Cartwright, W. B., 1716
 Castle, W. E., 1620
 Castro, D. de, 1921
 [Catcheside, D. G.], 1486
 Chaidze, I., 1861
 Chandratane, M. F., 1528
 Chang, Y. H., 1513–4, 1759, 1762
 Chao, Lien-Fang, 1512
 Cheesman, E. E., 1545
 Cherednichenko, A. F., 1867
 Chilton, St. J. P., 1764
 Chin, T. C., 1706
 Chitwood, B. G., 1797
 Chow, J. K., 1760
 Christensen, J. J., 1678
 Christoff, A., 1892
 Chwang, C. S., 1706
 Clapp, A. L., 1746
 Clark, C. F., 1796
 Clarke, S. E., 1515
 [Coit, J. E.], 1879
 Colin, H., 1828
 Compton, L. E., 1716
 Conagin, A., 1819
 Corbett, W., 1568
 Cornman, I., 1655
 Cour, L. F. La, see La Cour, L. F.
 Coutinho, L. de A., 1785
 Crim, R. F. *et al.*, 1734
 Cusset, F., p. 485
 Cutter, V. M. (jun.), 1677
 Cyrus, W. F., 1951
 Danielli, J. F., 1480, 1482
 Darlington, C. D., 1485
 Das Gupta, B., 1535
 [Davidson, H.], 1591–2
 Davis, C. D., 1746
 Davis, G. N., 1930
 Davis, M. B., 1559
 Deakin, A., 1618
 Decoux, L., 1823, 1829–30, 1835–9,
 1841, 1843–50
 Dedek, J., 1834, 1842
 Delaunay, A., 1628, 1672
 [Demerec, M.], 1590–2
 Depardon, L., 1915
 Deriaz, R. E., 1483
 Dickson, J. G., 1726, 1752
 Dillewijn, C. van, 1816
 Dionigi, A., 1707, 1858
 Dix Arnold, P. D., 1784
 Dixon, H. H., 1650
 Dobzhanski, T., see Dobzhansky,
 T.
 Dobzhansky, T. [1592], 1613, 1624
 Dodds, K. S., 1561–2, 1737
 Dojes, R. P., 1751
 Doortjes, J. A., 1881, 1885
 Draghetti, A., 1715
 Drain, B. D., 1908
 Drar, M., p. 486
 Driver, C. M., 1521, 1523
 Dubinin, N. P., 1629
 Dubois, J., p. 490
 DuBuy, H. B., 1665
 [Ducker, H. C.], 1525
 Dunlap, A. A., 1803
 Ehrenberg, L., 1643
 Eicke, R., 1688
 Eigsti, O. J., 1671
 Eldredge, J. C., 1956
 Elrod, J. M., 1782
 Elvers, I., 1661
 Engledow, F., 1541
 Ephrussi, B., 1616
 Epling, C., 1625
 Ernould, L., 1827
 Esbo, H., 1799
 [Evelyn, S. H.], 1523
 [Fairchild, D.], 1878
 Fan, F. R., 1571
 [Fano, U.], 1590–2
 Farstad, C. W., 1502, 1510
 Feng, T. M., 1761
 Fernandes, C. T., 1920
 Fernandez Valielo, M. V., 1798
 [Fielding, W. L.], 1525
 Finnemore, H., 1549
 Fitzpatrick, J. M., 1516
 Flory, W. S. (jun.), 1894
 Forlani, R., 1700
 Foster, R. E., 1936
 Frandsen, K. J., 1615
 Frandsén, N. O., 1686
 Fröier, K., 1721
 Gailey, F. B., 1675
 Ganguly, J. K., 1547
 Garlan, P., 1607
 Garman, H. R., 1939
 Gattani, M. L., 1684
 [Gay, H.], 1591
 Geddes, W. F., 1703
 Geerts, J. M., 1814
 Gerassimova, E. N., 1867
 Germek, E. B., 1758
 Gersh, E. S., 1616
 Gescher, N. von, 1783
 Ghose, R. L. M., 1534–5
 Giles, N. H. (jun.), 1673
 Gilly, C. L., 1735
 Ginneken, P. J. H., 1825
 Giovannelli, B., 1573
 Goidsenhoven, W. van, 1830, 1838–
 9, 1850
 Goldschmidt, R. B., 1630–1
 Goodman, G. J. R., 1739
 Gorham, P. R., 1554
 Gouaux, C. B., 1818, 1821
 Govande, G. K., 1531
 Graiff, G. L., 1699, 1702

Graner, E. A., 1733
 [Griswold, H. B.], 1880
 Groszmann, A., 1801
 Gudjónsson, G., 1869
 Guerreiro, M. G., 1903, 1920
 Guha, M. P., 1537
 Gupta, B. Das, see Das Gupta, B.
 Gustafsson, Å., 1657, 1771
 Györfy, B., 1614, 1690-2, 1857,
 1941

Hadorn, E., 1610
 Hansen, H. N., 1944
 Hansen, H. P., 1687, 1689
 Hansing, E. D., 1724-5
 Hanson, E. W., 1703
 [Harper, A. S.], 1525
 Harper, R. E., 1953
 Haskell, R. J., 1947
 Hastings, A., 1569
 Hawkes, J. G., 1521, 1523
 Hayes, H. K., 1611, 1731
 Hebert, L. P., 1818, 1821
 Heeger, E. F., 1863
 Henderson, R. G., 1851
 L'Héritier, P. L., 1477
 Heyn, F. A., 1626
 Heyne, E. G., 1724-5, 1746
 Hintsche, E. von, 1640
 [Hodgson, R. W.], 1880
 Hsu, Kuan-Jen, 1512
 Hsu, T. S., 1763
 Hugon de Scœux, F., 1477
 Hultén, E., 1810
 Humphrey, L. M., 1807
 Hurt, E. F., 1506
 Hutchinson, J. B., 1529, 1532
 Hutchinson, C. B. (Editor), p. 487

Ihsan-Ur-Rahman, Khan, see Khan,
 Ihsan-Ur-Rahman
 Ingold, C. T., 1489
 Ingram, C., 1556
 Irwin, M. R., 1476
 Ivancenko, D., 1834, 1842

Jakobsson, J., 1718
 [Jameson, J. D.], 1525
 Jasny, N., p. 488
 Jayaweera, D. M. A., 1548
 Jensen, L. A., 1747
 Johnson, L. P. V., 1566-7
 Johnson, M. J., 1675
 Johnson, T., 1501
 Johnsson, H., 1918
 Jones, C. R., 1499
 Jones, H. A., 1930, 1932
 Judkins, W. P., 1722

Kämpfer, M., 1927
 Kar, B. K., 1495
 Karper, R. E., 1755
 Kasparjan, A. S., 1802
 Kassanis, B., 1524
 [Kaufmann, B. P.], 1590-2
 Keitt, G. W., 1676
 Khan, Ihsan-Ur.-Rahman, 1530
 [King, H. E.], 1525
 Kirste, A., 1794
 Kleiner, E., 1633

[Knight, R. L.], 1525
 Kobel, F., 1876, 1882, 1914
 Köhler, E., 1688
 Koo, W. F., 1571
 Krantz, F. A., 1791
 Kreitlow, K. W., 1773
 Kreutzer, W. A., 1940
 Kristensen, R. K., 1795
 Krug, C. A., 1854-5
 Kuan-Jen, Hsu, see Hsu, Kuan-Jen
 Kuang, H. H., 1513-4, 1759, 1761-2

La Cour, L. F., 1485
 [Lammerts, W. E.], 1880
 Lantz, H. L., 1877
 Laromur, W. T., 1504
 Larson, R. H., 1932
 Lazar, O., 1832
 [Lea, D. E.], 1486
 Lebedeff, G. A., 1946
 Leben, C. C., 1676
 Lederberg, J., 1679
 Lefebvre, C. L., 1757
 Leggett, W. F., p. 490
 Lehoul, Y., 1628, 1672
 Lejeune, A. J., 1509
 Leslie, W. R., 1560, 1889
 Levan, A., 1648
 Lewis, H., 1625
 Li, W. C., 1760
 Liechti, A., 1637
 Lien-Fang, Chao, see Chao, Lien-
 Fang
 Lindberg, J. E., 1718
 Lindgren, C. C., 1622
 Lindquist, B., 1922
 Lineweaver, H., 1928
 Little, T. M., 1932
 Lombard, P. M., 1796
 Löve, Å., 1660
 Löve, D., 1659-60
 Love, R. M., 1775
 Lyerly, P. J., 1956
 Lynch, S. J., 1901
 Lysenko, T., 1870

[McClintock, B.], 1590-2
 McCrory, S. A., 1925
 [MacDonald, D.], 1525
 McKee, R., 1784
 [McKinstry, A. H.], 1525
 McMaster, P. G. W., 1544
 Maliani, C., 1743
 Mangelsdorf, P. C., p. 489
 Manunta, C., 1719
 Martin, A. C., 1668
 Mastenbroek, C., 1685
 Mayeaux, L. C. (jun.), 1817, 1820
 Meehan, F., 1727
 Mehta, T. R., 1546
 Melhus, I. E., 1735, 1739
 Mendes, A. J. T., 1856
 Mendes, J. E. T., 1855
 Merritt, P. P., 1703
 Meyer, K., 1720
 [Miller, W. L.], 1525
 Millington, A. J., 1496
 Minder, W., 1637
 Miranda, H. S., 1758
 Montelaro, J., 1954
 Moore, R. C., 1886, 1913

Moore, R. J., 1551, 1553
 Moraes, L. T., 1819
 Moran, T., 1499
 Morgan, T. H., 1647
 Morris, H. J., 1928
 Mowry, H., 1902
 Muller, H. J., 1612
 Müntzing, A., 1730
 Murphy, E., 1793
 Murphy, H. C., 1727
 Mustard, M. J., 1901
 Myers, W. M., 1773

Naidu, M., 1492
 [Nanton, W. R. E.], 1525
 Navashin, M. S., 1867
 Neal, N. P., 1738
 Neal, W. M., 1784
 Newcomer, E. H., 1639
 Newton, M., 1501
 Nickerson, D., 1666
 Nicolaisen, W., 1574
 Nigg, L., 1765
 Noll, A., 1714
 Novak, J., 1834
 Nozzolini, V., 1663
 Nyberg, C., 1882-3

Olive, L. S., 1757
 Olson, B. H., 1675
 Olson, P. J., 1609
 Östergren, G., 1729

Paddock, E. F., 1654
 Parker, J. H., 1750
 Parodi, L. R., 1753
 Parry, J. W., p. 488
 Parsons, T. H., 1565
 Patel, J. S., 1534
 [Pearson, E. O.], 1525
 [Peat, J. E.], 1525
 Perlova, R. L., 1792
 Perry, B. A., 1860
 Peters, J. J., 1656
 Phillips, H. M., 1642
 Phinney, B. O., 1741
 Pisarev, V. E., 1698, 1749
 Piza, S. de Toledo (jun.), 1623
 Plank, J. E. van der, 1522
 Platt, A. W., 1502, 1510
 Plattner, P. A., 1674
 Poddubnaja-Arnol'di, V. A., see
 Poddubnaya-Arnoldi, B. A.
 Poddubnaya-Arnoldi, B. A., 1749
 Porter, C. R., 1746
 Porter, J. W., 1738
 Potapov, A., 1912
 Pound, G. S., 1937
 Prakken, R., 1729
 [Prentice, A. N.], 1525
 Prokofieva-Belgovskaya, A. A.,
 1651
 Pryor, D. E., 1948

Quinby, J. R., 1755

Rajan, S. S., 1484
 Ranganathan, B., 1491
 Ray, W. W., 1806
 Reid, W. D., 1569-70

Index continued.

Ressovsky, N. W. Timoféeff-, see Timoféeff-Ressovsky, N. W.
 Revel, S. H., 1952
 Richards, M. C., 1943
 Rick, C. M., 1942
 Ricker, P. L., 1781
 Righter, F. I., 1916
 Rinke, E. H., 1731
 Ritchey, G. E., 1784
 Rodriguez, V. J., 1713
 Rogler, G. A., 1774
 Roland, G., 1829, 1831, 1836-7, 1847
 Rondoni, P., 1636
 Rosen, G. von, 1644
 Ross, A. F., 1800
 Roubaix, J. de, 1832
 [Rounds, M. B.], 1878
 Rudorf, W., 1884
 Ruehle, G. D., 1900
 [Ruston, F. D.], 1525
 Ryan, F. J., 1679
 Rygg, G. L., 1905
 S., G., 1808
 Sabnis, T. S., 1546
 Saint-Hilaire, A. de, p. 487
 [Salaman, M. G.], 1486
 Sampaio, S. C., 1819
 Sampath, S., 1484
 Sanders, F. K., 1481
 Sankaram, A., 1511
 Sansome, E. R., 1490 [1590-2]
 Santos, A., 1785
 Sanyal, A. T., 1534
 Sass, J. E., 1740
 Schiemann, E., 1575, 1712
 Schlösser, L.-A., 1605
 Schmieder, M. v., 1765
 [Schroeder, C. A.], 1879-80
 Schultz, J., 1647
 Scott, L. B., 1822
 Scott, W. O., 1746
 Séguéla, J. M., 1705
 Seiglinger, J. B., 1754
 Semeniuk, G., 1739
 Serra, J. A., 1662
 Shapiro, N. I., 1617
 Sharman, B. C., 1709
 Shay, J. R., 1676
 Sherwin, H. S., 1757
 Shevkenek, W., 1515
 Shimoya, C., 1864
 Shull, G. H., 1732
 Siang Yin Ko, 1726
 Sikka, S. M., 1530
 Simlote, K. M., 1527
 Simmonds, N. W., 1562, 1737
 Simon, E. C., 1813
 Simon, M., 1823, 1829-31, 1835-9,
 1841, 1843-50
 Simpson, G. G., p. 485
 Singh, S. P., 1484
 Singleton, W. R., 1955
 Sirks, M. J., 1619
 Slate, G. L., 1906
 Smith, F. F., 1933
 Snyder, W. C., 1944
 Sørensen, T., 1869
 Sparks, W. C., 1931
 Sprague, G. F., 1507
 Stacey, M., 1483
 Stahl, C., 1769
 Stahl, J. L., 1909
 Stakman, E. C., 1703
 Stanton, T. R., 1724-5
 Stebbins, G. L. (jun.), 1776
 Steelman, C. H. (jun.), 1898
 Stefaniak, J. J., 1675
 Steiner, E., 1938
 Stepanov, V. N., 1696
 Stephens, J. C., 1756
 Stern, H., 1652
 Stevens, O. A., 1871
 Stevenson, G. C., 1538
 Steyaert, R. L., 1638
 Straib, W., 1714
 Stratton, F. J. M., 1467
 Stroman, G. N., 1945
 Strong, F. M., 1738
 Struckmeyer, B. E., 1887
 Stuart, A., 1503
 Stuart, N. W., 1934
 Stuckey, I. H., 1770
 Subramaniam, M. K., 1491
 Sukhatme, P. V., 1469
 Summers, E. M., 1815
 Sun, V. G., 1788-9
 [Sutton, E.], 1590
 Svenson, H. K., 1667
 Swen, C. I., 1710
 Täckholm, G., p. 486
 Täckholm, V., p. 486
 Taggart, W. G., 1812, 1821
 Teece, E. G., 1483
 Thomas, A. S., 1550
 Thomas, I., 1496
 Thomas, P. T., 1952
 Thompson, H. C., p. 490
 Timoféeff-Ressovsky, N. W., 1621
 Timofeev, N. N., 1790, 1872, 1935
 Ting, C. L., 1949
 Tiniakov, G. G., 1629
 Todd, F. E., 1779
 [Topper, B. F.], 1880
 Törnqvist, G. I., 1584
 Torrie, J. A., 1726
 Travin, I. S., 1632
 Tsiang, Y. S., 1731
 Tu, D. S., 1513-4, 1759, 1762
 Tukey, H. B., 1890
 Tullis, E. C., 1764
 Turrell, F. M., 1883
 Turrill, W. B., 1487
 Tysdal, H. M., 1778
 Ullstrup, A. J., 1745
 Valencia, J. L., 1776
 Valencia, R. M., 1776
 Valfiela, M. V. Fernandez, see Fernandez Valfiela, M. V.
 Valleau, W. D., 1852
 Vanderwaeren, J., 1823, 1830-1,
 1841, 1843-50
 Vansell, G. H., 1779
 Vasatko, J., 1834
 Vendrelly, R., 1628, 1672
 Venkataramani, K. S., 1563-4
 Viégas, G. P., 1758
 Vik, K., 1950
 Vinogradova, N. M., 1698, 1749
 Vogt, 1681
 Waal, D. de, 1711
 Walker, C., 1505
 Walker, J. C., 1932, 1936
 Wallin, J. R., 1701, 1739
 Wang, F. H., 1742
 Wanscher, J. H., 1634
 Warmke, H. E. [1590-2], 1653
 Waterman, A. M., 1919
 Watkins, G. M., 1739
 Weast, C. A., 1928
 [Weatherley, P. E.], 1525
 [Webber, H. J.], 1879
 Webster, R. E., 1948
 Weibel, R. O., 1859
 Weimer, J. L., 1782
 Weiss, J., 1478
 Wellensiek, S. J., 1606, 1627, 1635,
 1853
 Wellington, R., 1891
 Went, F. W., 1664
 Werth, E., 1786
 [West, J.], 1525
 Westergaard*, M., 1646
 Wexelsen, H., 1723
 White, W. J., 1517
 Wiggins, L. F., 1483
 Wiidakas, W., 1747
 Wiklund, K., 1728
 Wilcox, A. N., 1907
 Wilson, G. B., 1911
 Wilson, J. D., 1929
 Witkin, E. M., 1670
 Witkus, E. R., 1658
 Wood, R. C., p. 487
 Woods, M. W., 1665
 Woodworth, C. M., 1859
 Yang, M. N., 1805
 Young, V. H., 1807
 Yusuf, N. D., 1539

THE IMPERIAL BUREAU OF PLANT BREEDING AND GENETICS.

School of Agriculture, Cambridge, England.

Consultant Director:

PROF. SIR FRANK L. ENGLEDOW, C.M.G., M.A., Drapers' Professor of Agriculture.

Director: P. S. HUDSON, Ph.D.

Assistants: Miss M. L. C. WILSON, B.A.

R. H. RICHENS, M.A.

MISS T. ASHTON, M.A.

Publications:

PLANT BREEDING ABSTRACTS.

Issued quarterly. Subscription 25/-, with Subject Index. (Subscriptions sent direct from within the British Commonwealth of Nations are subject to a reduction of 5/-). Single copies 7/6 each. Drafts should be made out in sterling currency.

Back numbers: Vols I—V, 35/- per volume, single numbers 15/-, other Vols 25/-, single numbers 7/6.

Copies of "Plant Breeding Abstracts" printed on one side of the paper can be supplied, for the convenience of readers wishing to cut up and file the references, at an additional cost of 5/- per volume.

Important Note.—Every effort is made to make Plant Breeding Abstracts as complete as possible and its notices of papers referring to plant breeding or the genetics of crop plants as prompt as possible. To aid in this, authors are invited to send to the Director copies of their papers immediately on publication.

Other Publications :

TECHNICAL COMMUNICATIONS

Joint Publication No. 1. Vernalization and Phasic Development of Plants .. 10 0

An Outline of Cytological Technique for Plant Breeders 1 6

The Action and Use of Colchicine in the Production of Polyploid Plants, by J. L. Fyfe 1 0

Field Trials: their Lay-out and Statistical Analysis by John Wishart 2 6

Joint Publication No. 3. The Breeding of Herbage Plants in Scandinavia and Finland 4 0

Potato Collecting Expeditions in Mexico and South America, by J. G. Hawkes .. 3 0

New and Promising Varieties recently described in the Literature (Six issues) each 1 0

Joint Publication No. 5. The Production of Seed of Root Crops and Vegetables .. 3 0

Photoperiodism in the Potato, by C. M. Driver and J. G. Hawkes 2 6

Potato Collecting Expeditions in Mexico and South America. II. Systematic Classification of the Collections, by J. G. Hawkes 7 6

Cultivation and Breeding of Russian Rubber-bearing Plants 2 6

Joint Publication No. 8. Forest Tree Breeding and Genetics, by R. H. Richens 5 0

TECHNICAL COMMUNICATIONS—continued.

The New Genetics in the Soviet Union, by P. S. Hudson and R. H. Richens .. 6 0

The Use of Heterosis in the Production of Agricultural and Horticultural Crops, by Miss T. Ashton 3 0

INDEXES

Subject Index to Vols I to V of Plant Breeding Abstracts 2 6

Subject Index to Vols VI to VIII of Plant Breeding Abstracts 2 6

Subject Index to Vols IX, X, XI, and XII of Plant Breeding Abstracts .. each 2 6

BIBLIOGRAPHICAL MONOGRAPHS

Bibliography on Interspecific and Inter-generic Hybridization in Relation to Plant Breeding 2 0

Rye Breeding Bibliography 1 6

Bibliography on Breeding Sorghums and Millets 1 0

The Experimental Production of Haploids and Polyploids 2 6

Tobacco Breeding Bibliography 1 0

Bibliography of Baking Quality Tests, Supplement 1 6

Bibliography on Insect Pest Resistance in Plants 1 6

Subscriptions to any of the above Publications should be sent to Imperial Agricultural Bureaux, Central Sales Branch, Penglais, Aberystwyth, Wales.

Loss in Transit.—Claims for numbers of Plant Breeding Abstracts lost in transit will only be considered if notice of such loss is received within three months of the date of posting.

IMPERIAL AGRICULTURAL BUREAUX

JOURNALS PUBLISHED BY BUREAUX ON RELATED SUBJECTS

Herbage Abstracts	Published by the Imperial Bureau of Pastures and Forage Crops, Aberystwyth.
Forestry Abstracts	Imperial Forestry Bureau, Oxford.
Horticultural Abstracts	Imperial Bureau of Horticulture and Plantation Crops, East Malling.
Soils and Fertilizers	Imperial Bureau of Soil Science, Harpenden.

Annual subscription to the above journals is 25s. (with a special reduction of 20 per cent for orders received direct from subscribers in Great Britain, the Dominions and Colonies).

RECENT AND FORTHCOMING OCCASIONAL PUBLICATIONS ON
AGRICULTURE AND FORESTRY

I.A.B. JOINT PUBLICATIONS

No.			
8.	Forest Tree Breeding and Genetics. By R. H. Richens. Imperial Bureau of Plant Breeding and Genetics and Imperial Forestry Bureau. 1945 ..	5s. 0d.	
10.	The Use and Misuse of Shrubs and Trees as Fodder. Imperial Bureaux of Pastures and Forage Crops and Animal Nutrition and Imperial Forestry Bureau. 1946	6s. 0d.	
11.	Some British Books on Agriculture, Nutrition, Forestry and Related Sciences, 1939-45. 1946	3s. 0d.	

TECHNICAL COMMUNICATIONS, ETC.

Imperial Bureau of Pastures and Forage Crops, Aberystwyth.

36.	The Grasslands of Latin America. By Miss G. M. Roseveare. 1946	7s. 6d.
37.	The Forage Resources of Latin America—Peru. By H. W. Alberts. 1946	2s. 6d.
38.	Advances in Grassland Husbandry and Fodder Production. Second Symposium. 1946	4s. 0d.

Imperial Forestry Bureau, Oxford.

5. Management in Selection Forest, with Particular Reference to the Application of the "Méthode du Contrôle" in Switzerland. By H. Knuchel. 1946 3s. 0d.

Imperial Bureau of Horticulture and Plantation Crops, East Malling

18. Fruit Fall and its Control by Synthetic Growth Substances. By M. C. Vyvyan. 1946 3s. 6d.

Imperial Bureau of Soil Science, Harpenden.

44. The Spectrographic Analysis of Soils and Plants. By R. L. Mitchell. 1946 4s. Od.

Imperial Mycological Institute, Kew.

13.	A Note on Banana Leaf Speckle in Jamaica and Some Associated Fungi. By E. B. Martyn. 1945	1s. 3d.
14.	A Preliminary List of Plant Diseases in the Anglo-Egyptian Sudan. By A. S. Boughey. 1946	3s. 0d.
15.	The Follicolous Ascomycetes, their Parasites and Associated Fungi. By C. G. Hansford. 1946	18s. 0d.
16.	Revisions of and Additions to Indian Fungi. By B. B. Mundkur and M. J. Thirumalachar. 1946	3s. 9d.

All correspondence regarding subscriptions to current and back volumes of abstracting journals and the purchase of Occasional Publications, Technical Communications, Bulletins, Bibliographies, etc., to be sent to—Imperial Agricultural Bureaux, Central Sales Branch, Penglais, ABERTYNSWYTH, Great Britain.